FIG.1

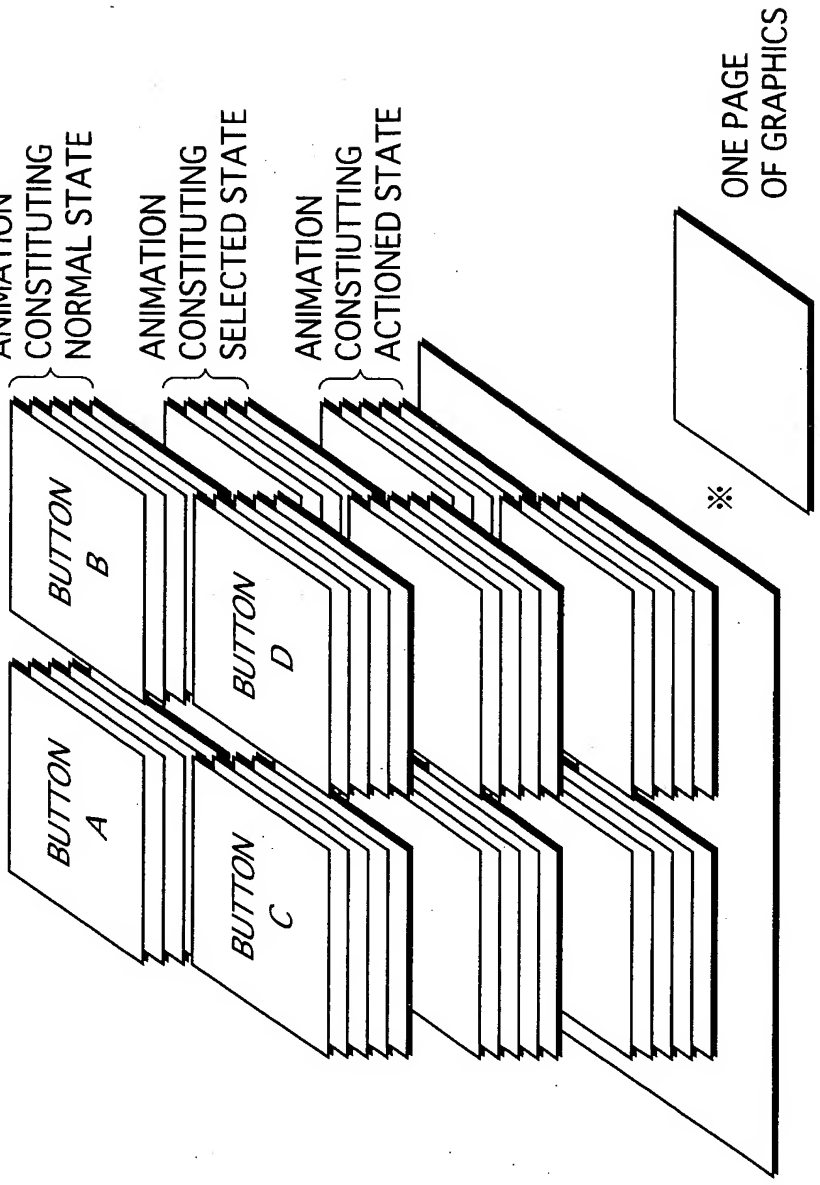

ANIMATION CONSTITUTING NORMAL STATE
ANIMATION CONSTITUTING SELECTED STATE
ANIMATION CONSTIUTTING ACTIONED STATE
ONE PAGE OF GRAPHICS
BUTTON A
BUTTON B
BUTTON C
BUTTON D
※

FIG.2A

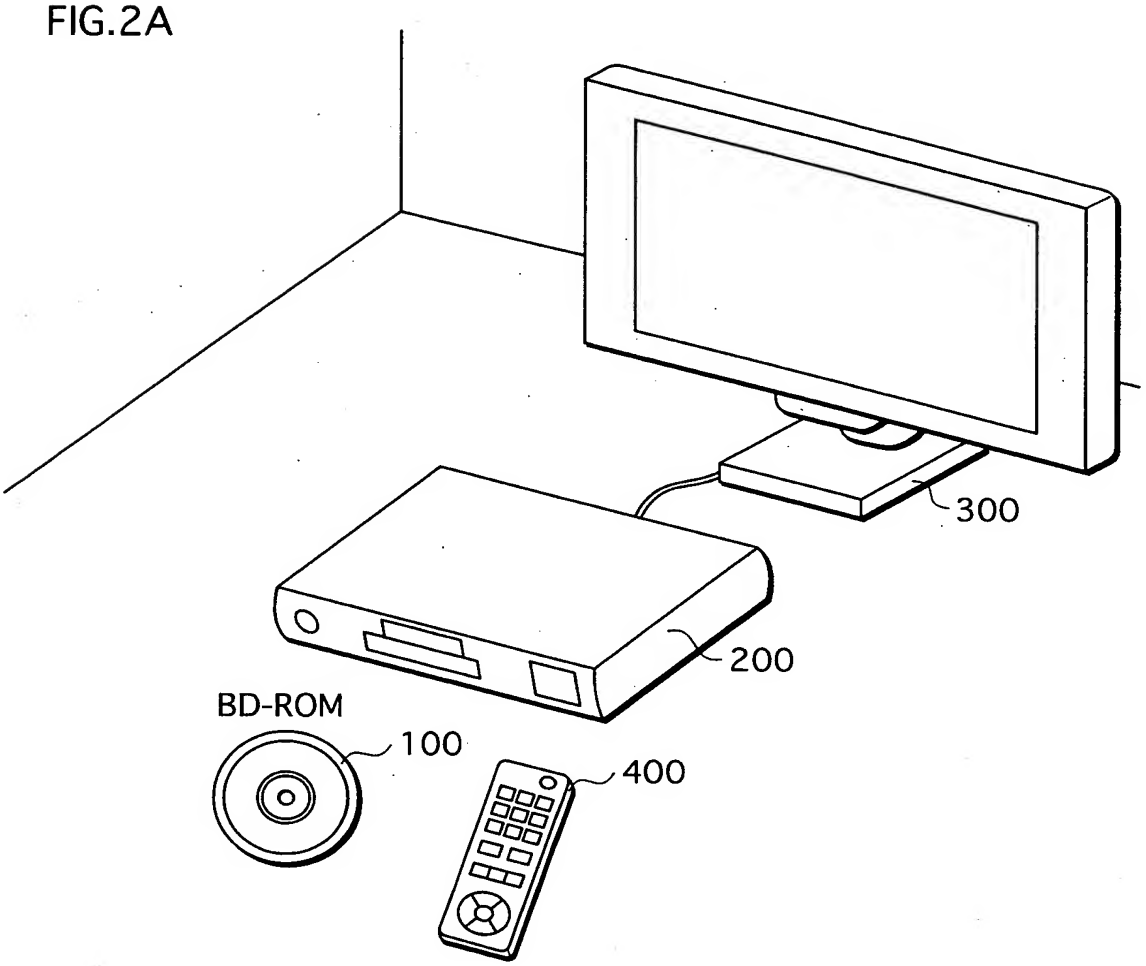

300
200
BD-ROM
100
400

FIG.2B

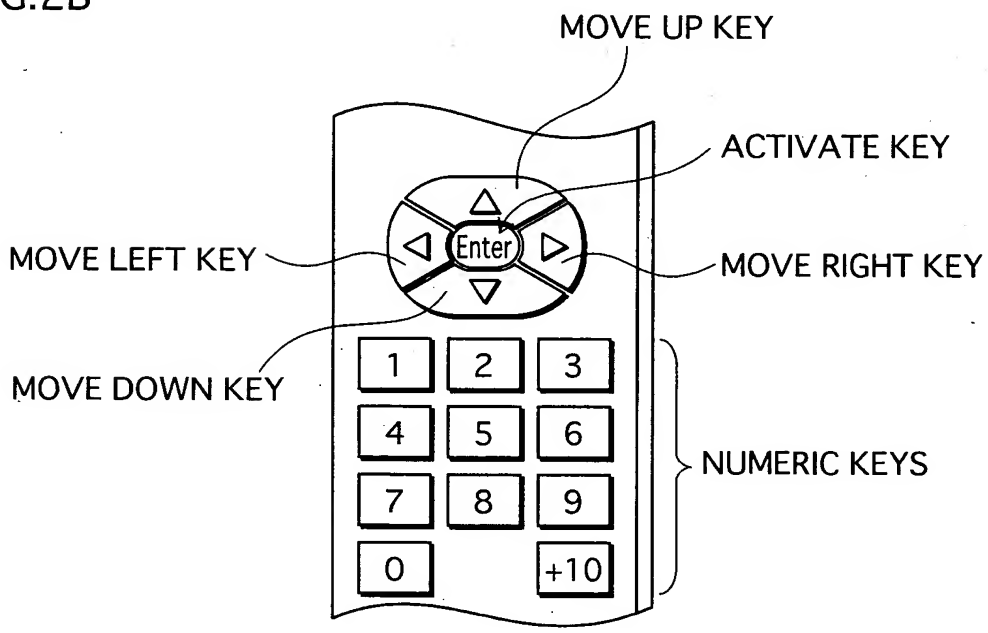

MOVE UP KEY
ACTIVATE KEY
MOVE LEFT KEY
Enter
MOVE RIGHT KEY
MOVE DOWN KEY
1
2
3
4
5
6
7
8
9
0
+10
NUMERIC KEYS

FIG.3

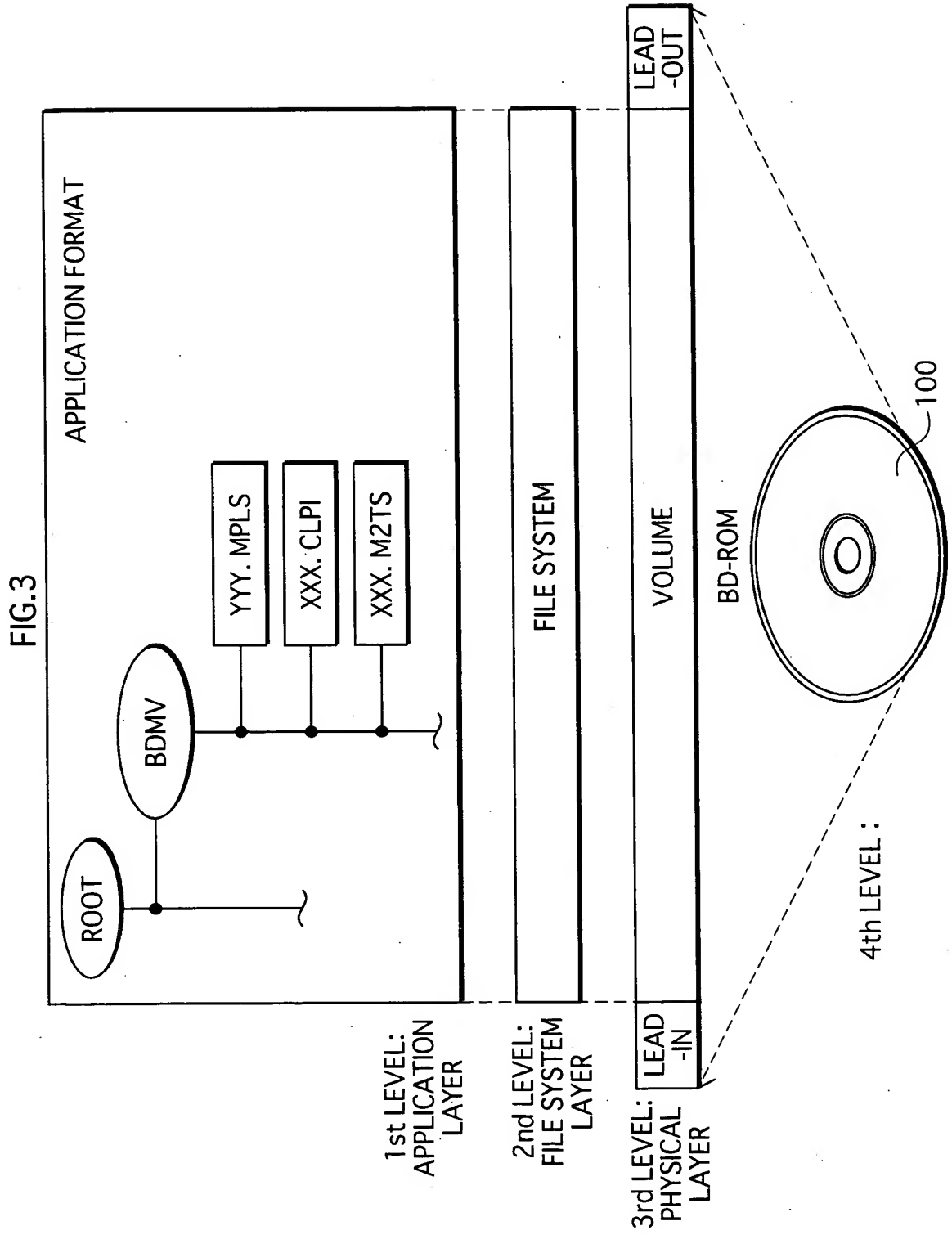

APPLICATION FORMAT
ROOT
BDMV
YYY. MPLS
XXX. CLPI
XXX. M2TS
FILE SYSTEM
VOLUME
LEAD -IN
LEAD -OUT
BD-ROM
100
1st LEVEL: APPLICATION LAYER
2nd LEVEL: FILE SYSTEM LAYER
3rd LEVEL: PHYSICAL LAYER
4th LEVEL :

FIG.4

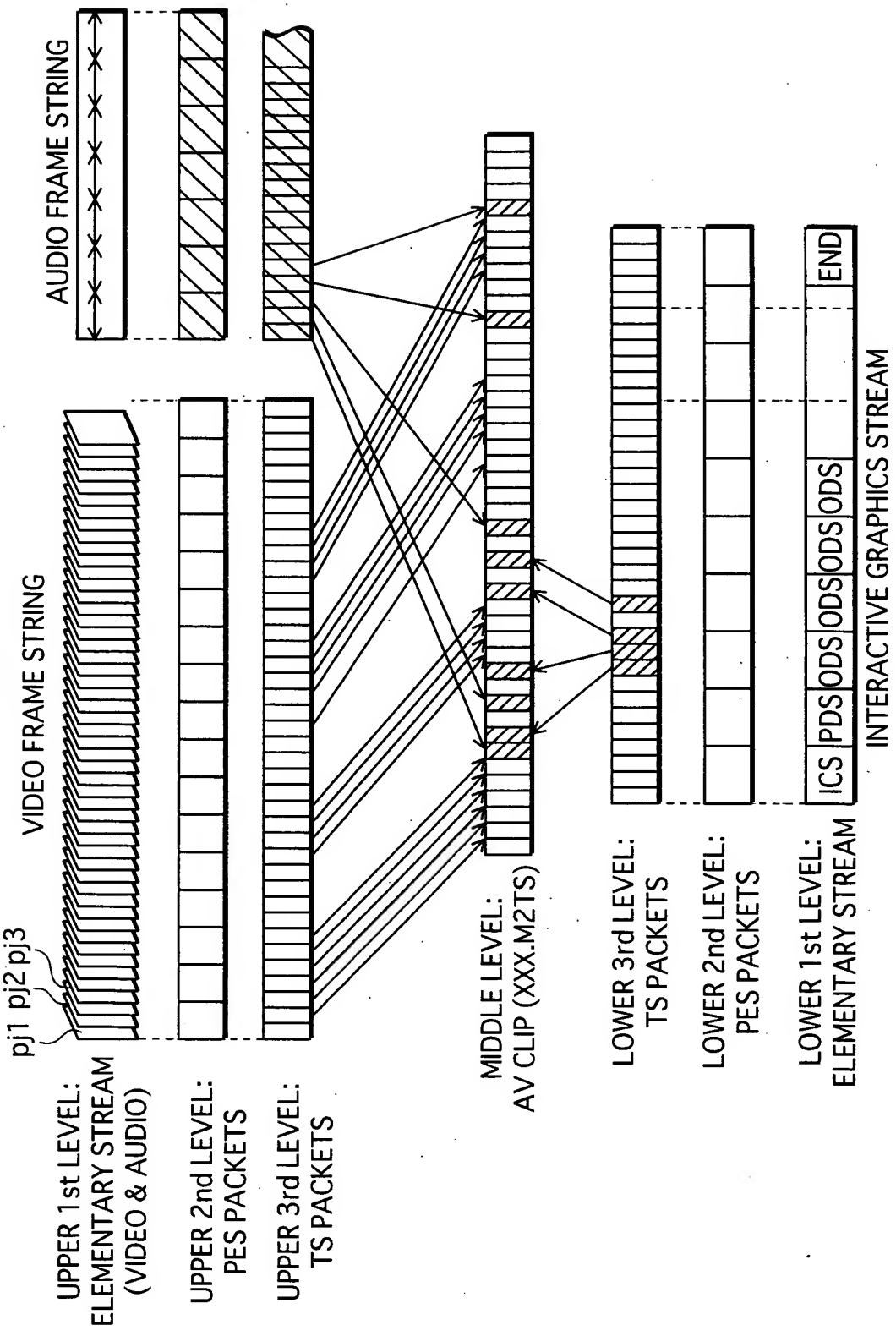

AUDIO FRAME STRING
VIDEO FRAME STRING
pj1 pj2 pj3
UPPER 1st LEVEL: ELEMENTARY STREAM (VIDEO & AUDIO)
UPPER 2nd LEVEL: PES PACKETS
UPPER 3rd LEVEL: TS PACKETS
MIDDLE LEVEL: AV CLIP (XXX.M2TS)
LOWER 3rd LEVEL: TS PACKETS
LOWER 2nd LEVEL: PES PACKETS
LOWER 1st LEVEL: ELEMENTARY STREAM
ICS
PDS
ODS
ODS
ODS
ODS
END
INTERACTIVE GRAPHICS STREAM

FIG.5

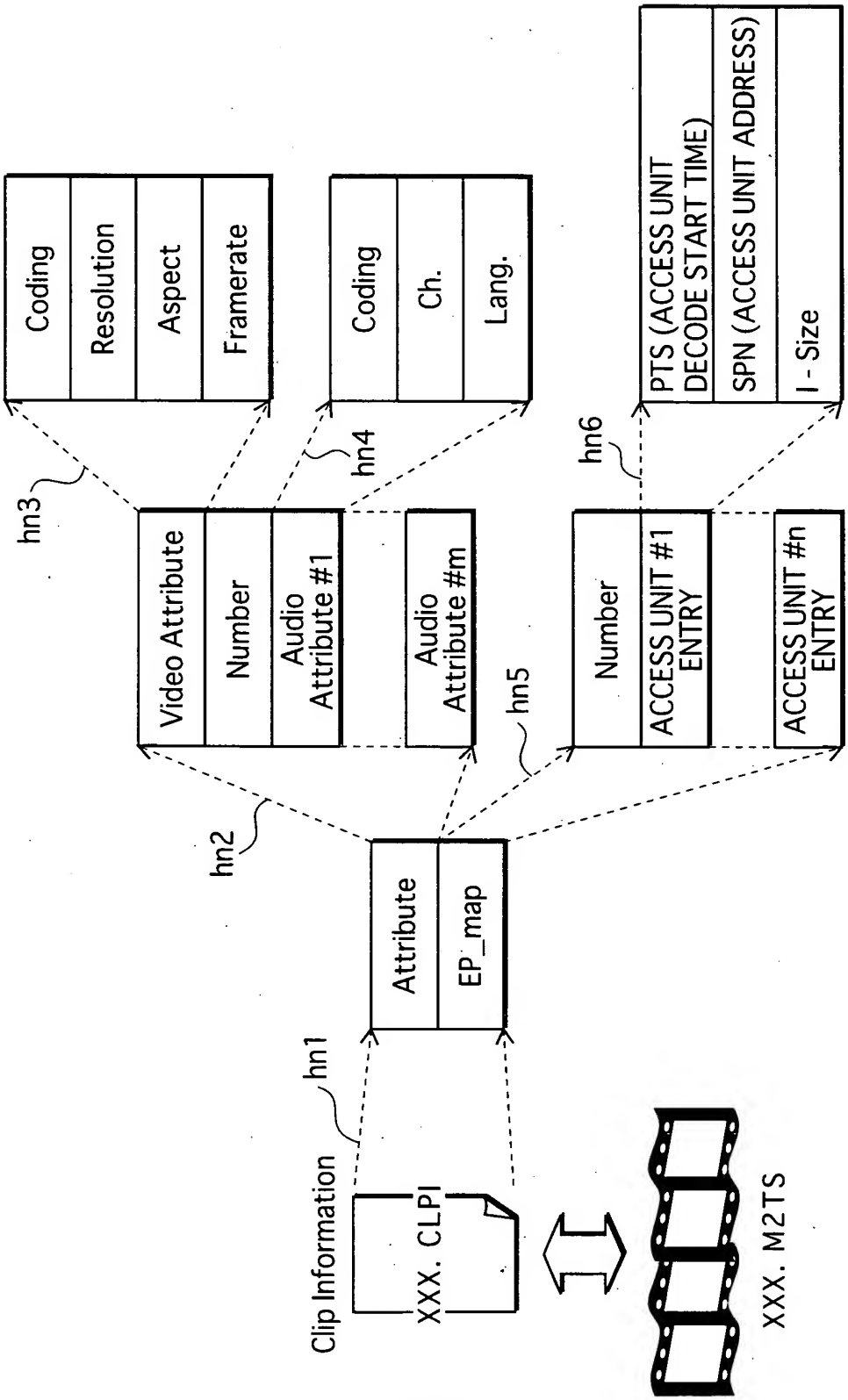

Clip Information
XXX. CLPI
hn1
Attribute
EP_map
hn2
Video Attribute
Number
Audio Attribute #1
Audio Attribute #m
hn3
Coding
Resolution
Aspect
Framerate
hn4
Coding
Ch.
Lang.
hn5
Number
ACCESS UNIT #1 ENTRY
ACCESS UNIT #n ENTRY
hn6
PTS (ACCESS UNIT DECODE START TIME)
SPN (ACCESS UNIT ADDRESS)
I - Size
XXX. M2TS

FIG.6

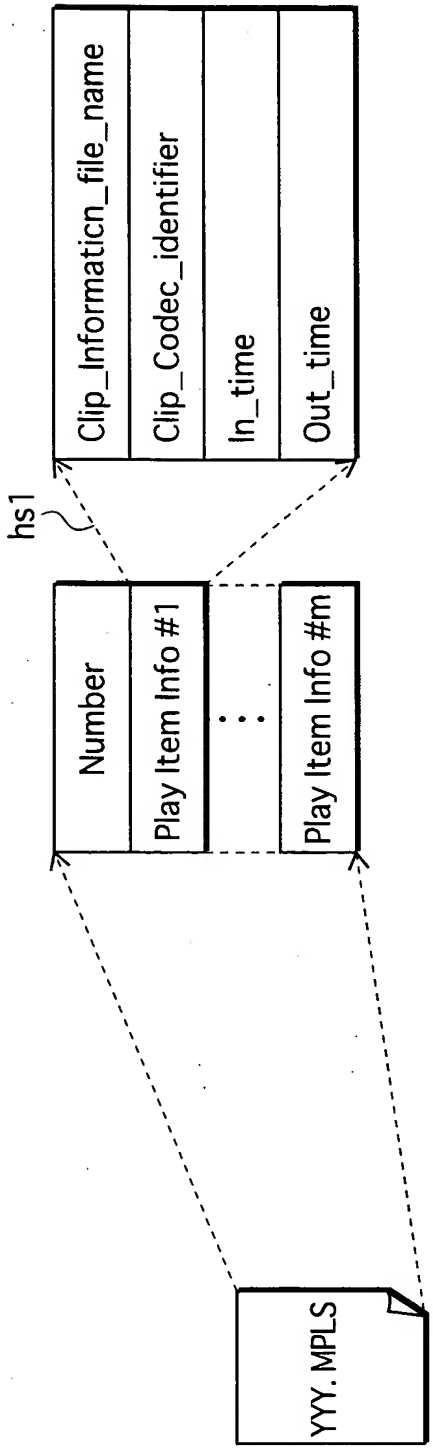
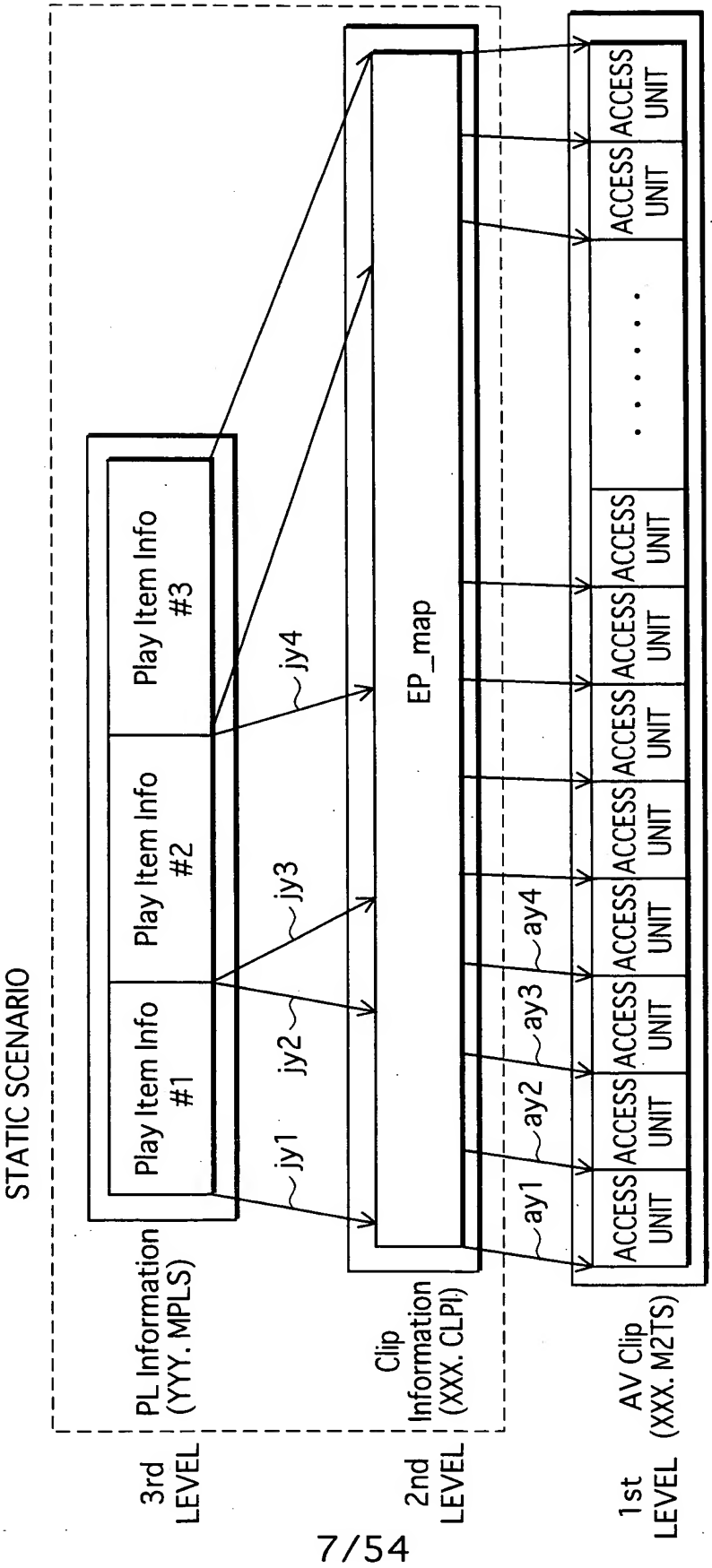

Clip_Informatien_file_name
Clip_Codec_identifier
In_time
Out_time
hs1
Number
Play Item Info #1
Play Item Info #m
YYY. MPLS

FIG.7


STATIC SCENARIO
PL Information (YYY. MPLS)
Play Item Info #1
Play Item Info #2
Play Item Info #3
jy1
jy2
jy3
jy4
Clip Information (XXX. CLPI)
EP_map
ay1
ay2
ay3
ay4
AV Clip (XXX. M2TS)
ACCESS UNIT
3rd LEVEL
2nd LEVEL
1st LEVEL

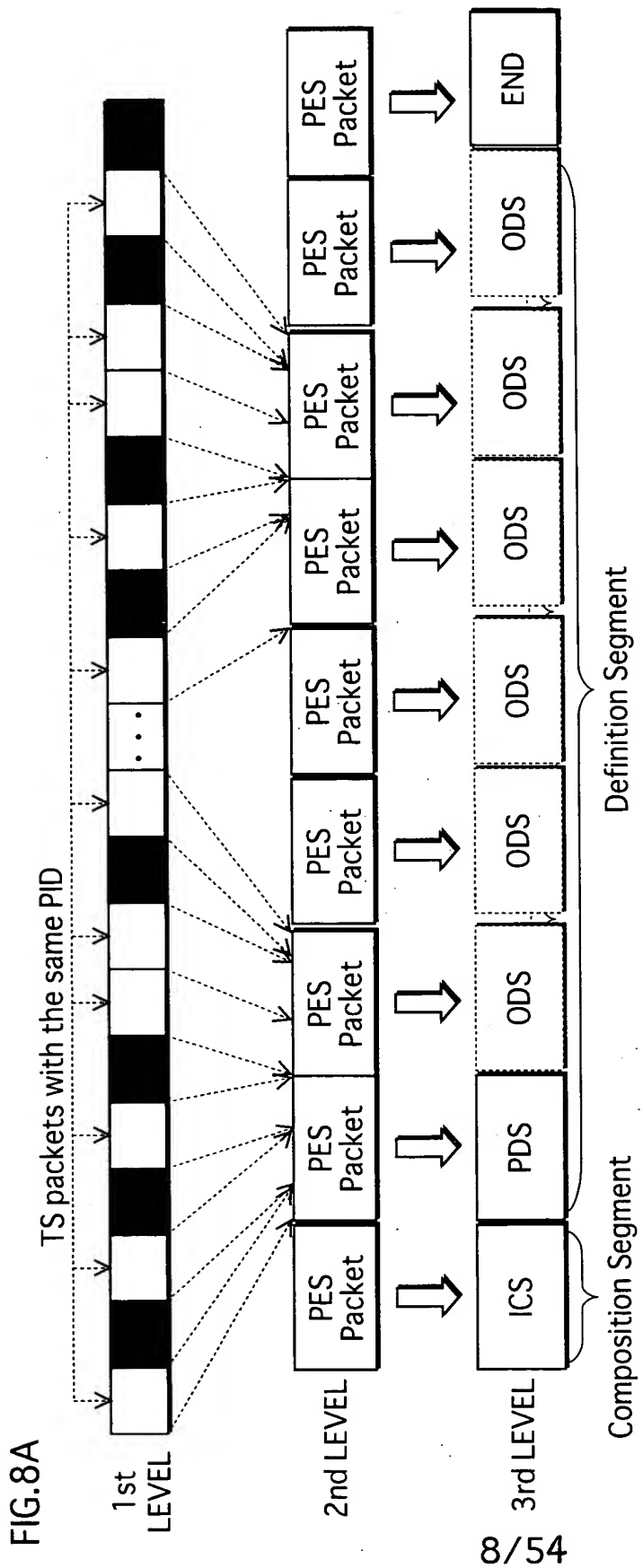

TS packets with the same PID
1st LEVEL
2nd LEVEL
3rd LEVEL
PES Packet
ICS
PDS
ODS
END
Composition Segment
Definition Segment

FIG.8A

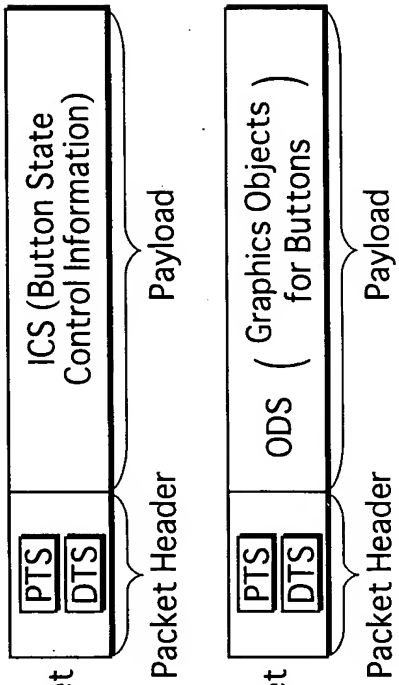

PES Packet
PTS
DTS
Packet Header
ICS (Button State Control Information)
Payload
PES Packet
PTS
DTS
Packet Header
ODS (Graphics Objects for Buttons)
Payload

FIG.8B

FIG.9

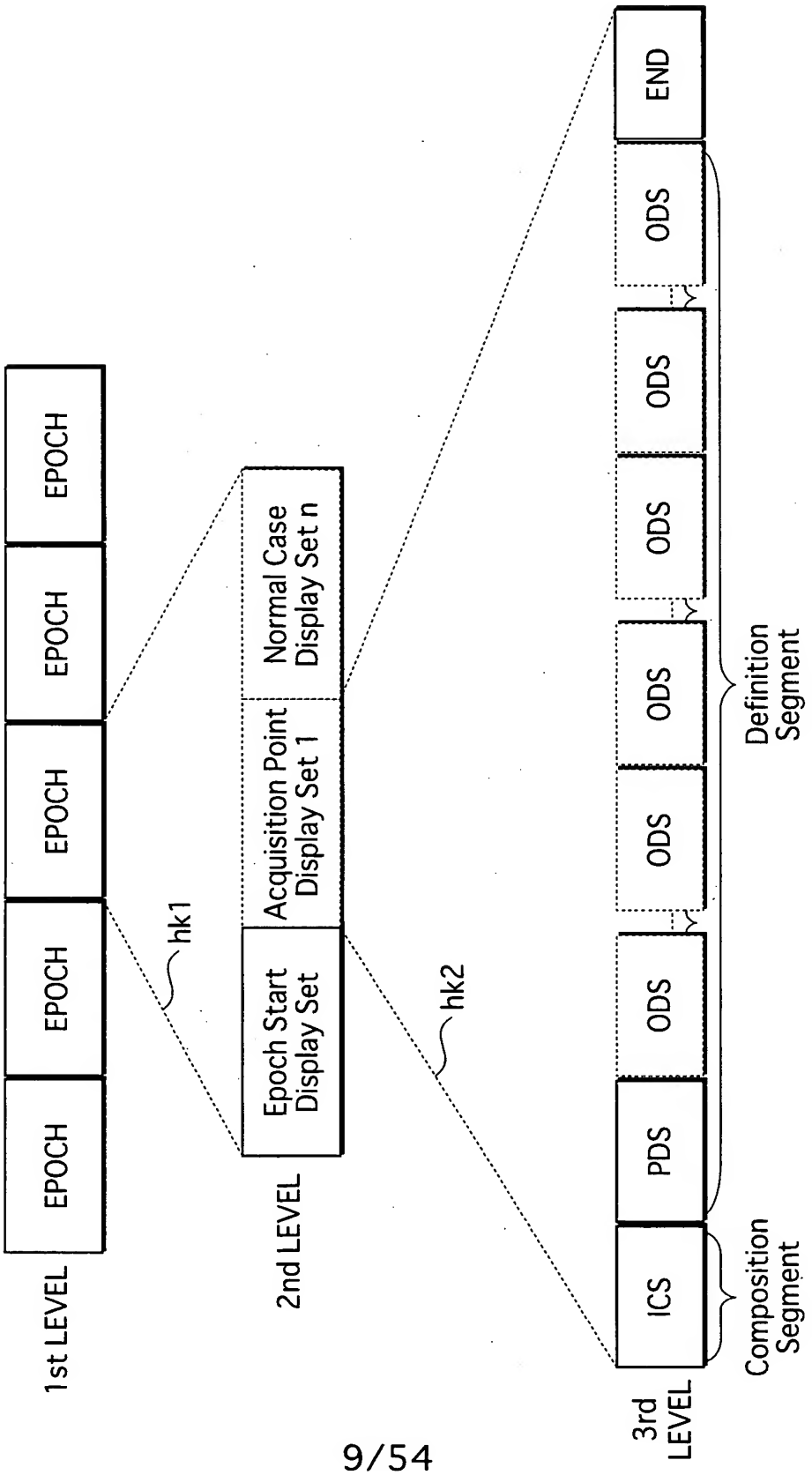

1st LEVEL
EPOCH
EPOCH
EPOCH
EPOCH
EPOCH
hk1
2nd LEVEL
Epoch Start Display Set
Acquisition Point Display Set 1
Normal Case Display Set n
hk2
3rd LEVEL
ICS
PDS
ODS
ODS
ODS
ODS
ODS
END
Composition Segment
Definition Segment

FIG.10A

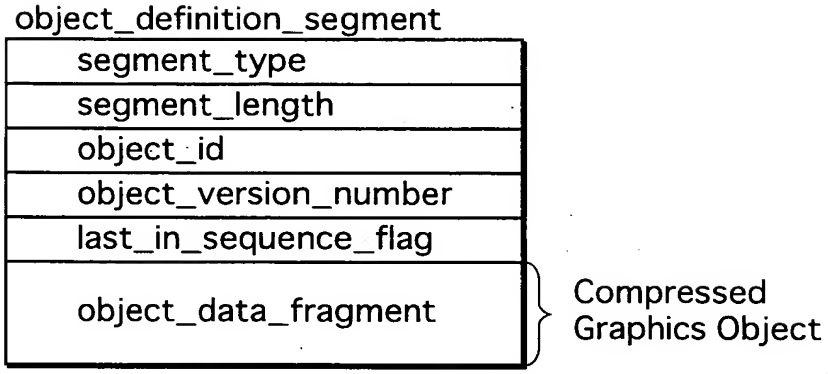


FIG.10B

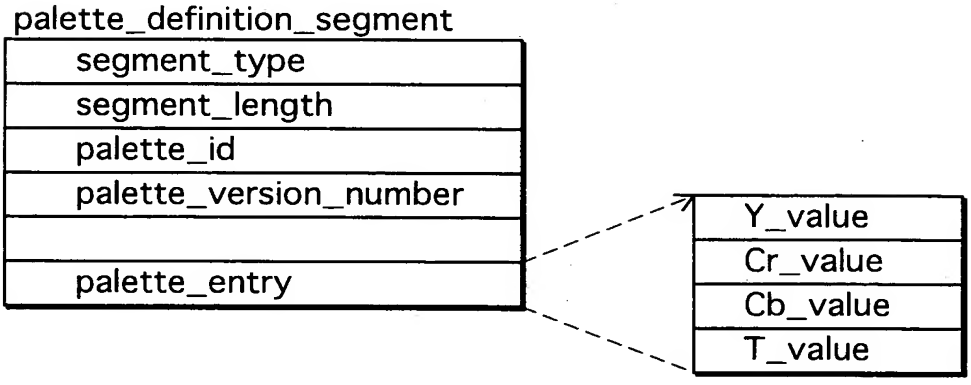


FIG.11

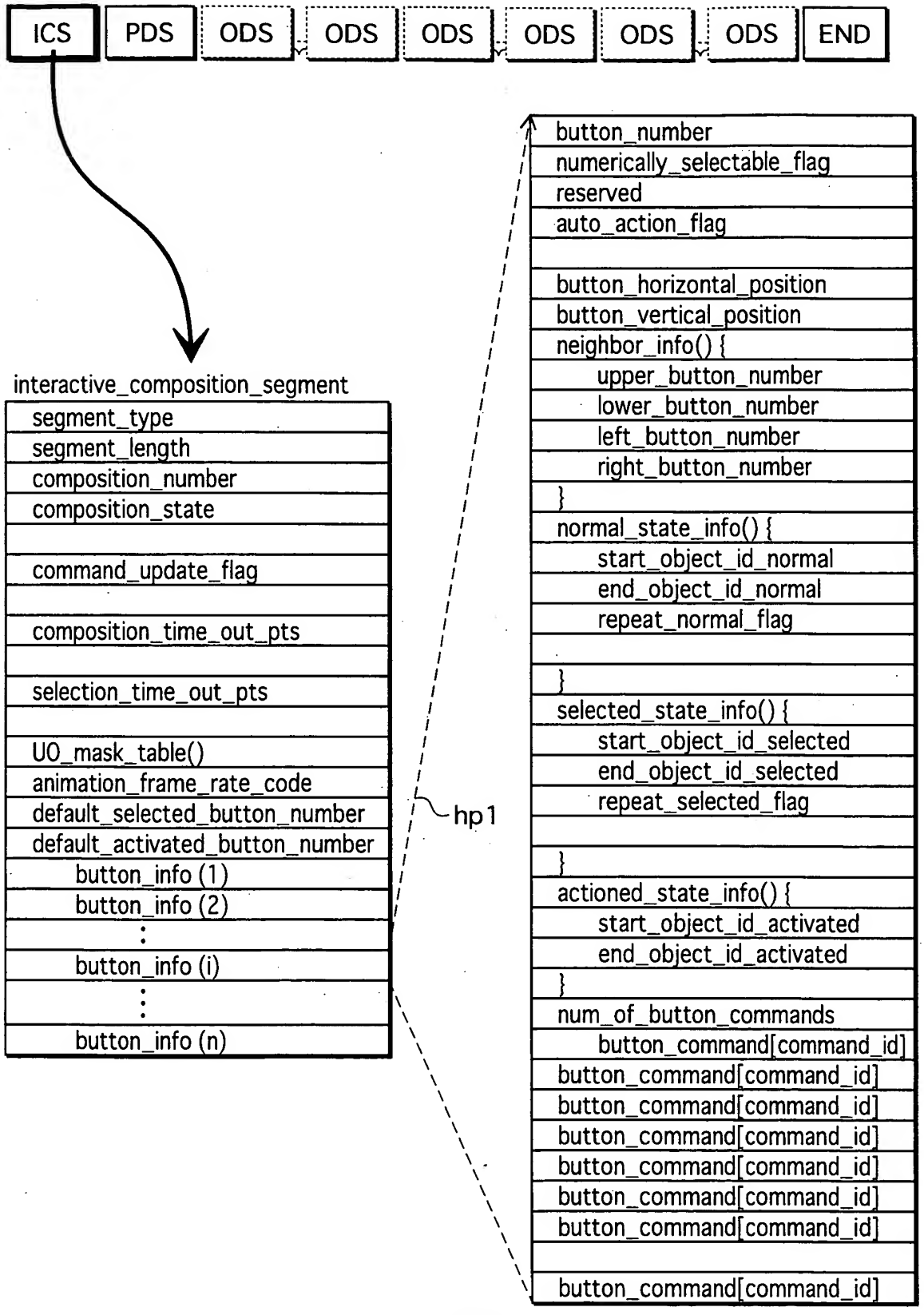

ICS
PDS
ODS
ODS
ODS
ODS
ODS
ODS
END
interactive_composition_segment
segment_type
segment_length
composition_number
composition_state
command_update_flag
composition_time_out_pts
selection_time_out_pts
UO_mask_table()
animation_frame_rate_code
default_selected_button_number
default_activated_button_number
button_info (1)
button_info (2)
button_info (i)
button_info (n)
hp1
button_number
numerically_selectable_flag
reserved
auto_action_flag
button_horizontal_position
button_vertical_position
neighbor_info() {
upper_button_number
lower_button_number
left_button_number
right_button_number
}
normal_state_info() {
start_object_id_normal
end_object_id_normal
repeat_normal_flag
}
selected_state_info() {
start_object_id_selected
end_object_id_selected
repeat_selected_flag
}
actioned_state_info() {
start_object_id_activated
end_object_id_activated
}
num_of_button_commands
button_command[command_id]
button_command[command_id]
button_command[command_id]
button_command[command_id]
button_command[command_id]
button_command[command_id]
button_command[command_id]

FIG.12

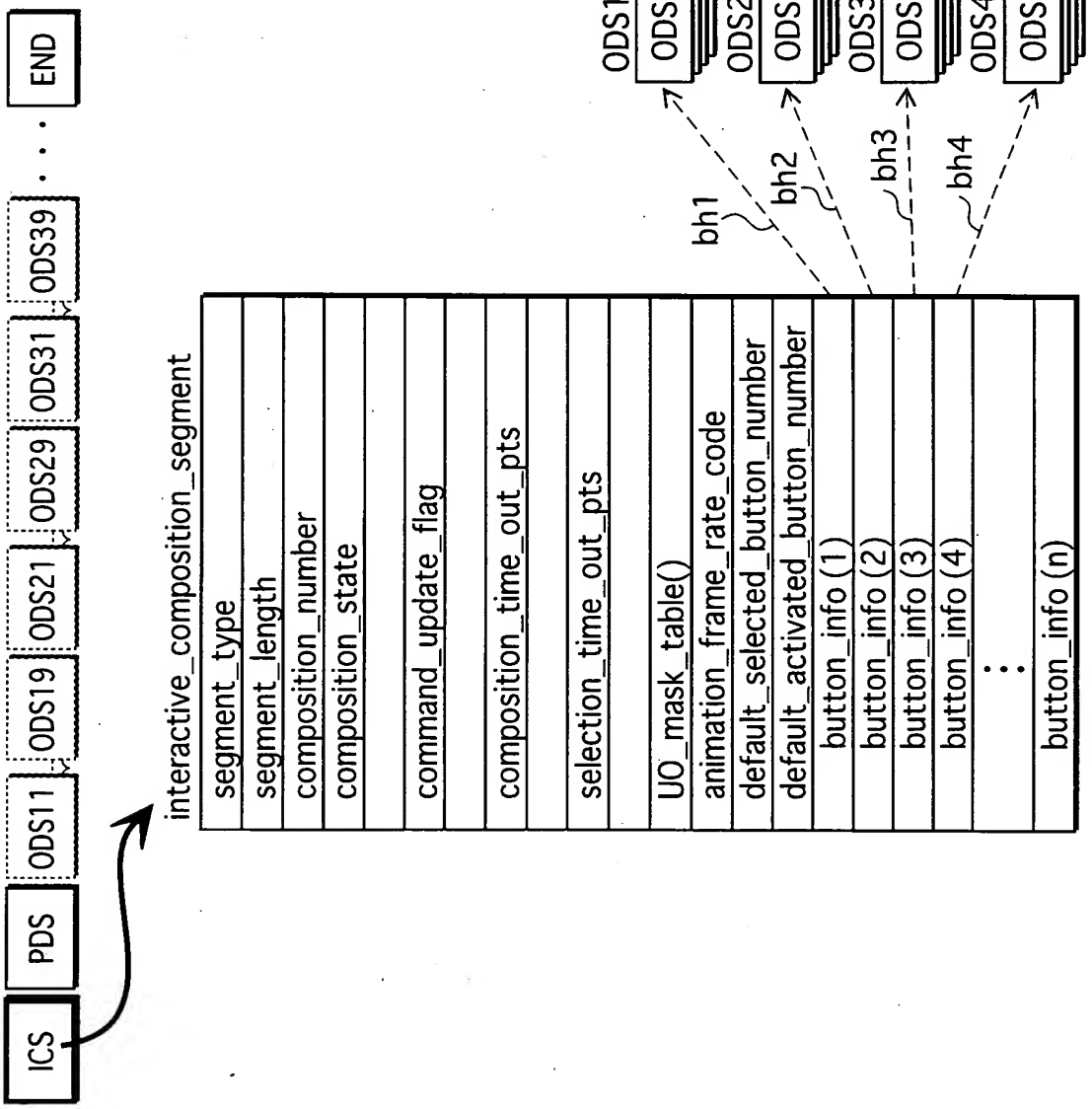

ICS
PDS
ODS11
ODS19
ODS21
ODS29
ODS31
ODS39
END
interactive_composition_segment
segment_type
segment_length
composition_number
composition_state
command_update_flag
composition_time_out_pts
selection_time_out_pts
UO_mask_table()
animation_frame_rate_code
default_selected_button_number
default_activated_button_number
button_info (1)
button_info (2)
button_info (3)
button_info (4)
button_info (n)
bh1
bh2
bh3
bh4
BUTTONS
A CLERK
B TEACHER
C DOCTOR
D BUSINESS MAN
ODS11-19
ODS11
ODS21-29
ODS21
ODS31-39
ODS31
ODS41-49
ODS41

FIG. 13

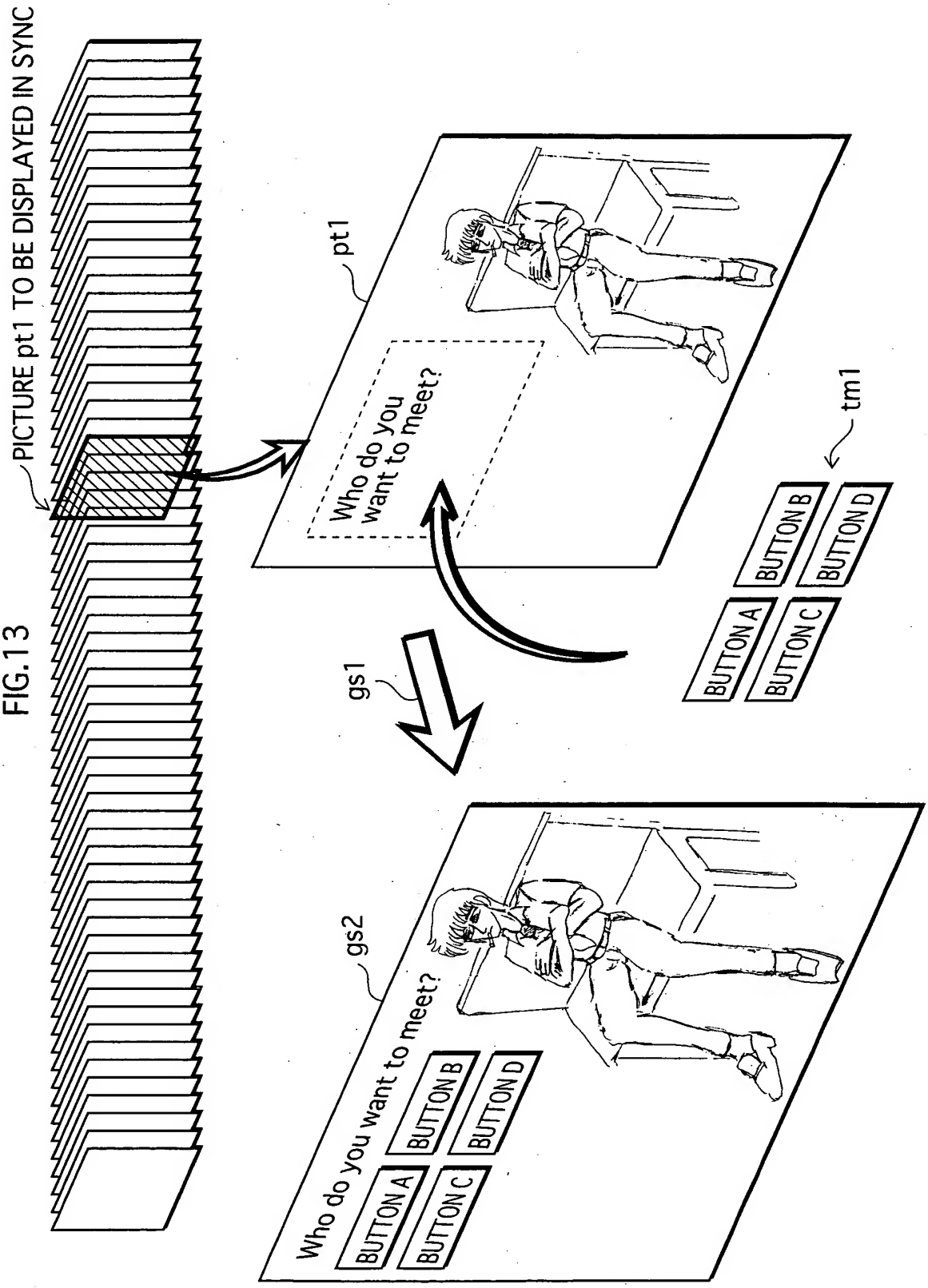

PICTURE pt1 TO BE DISPLAYED IN SYNC
pt1
Who do you want to meet?
tm1
BUTTON B
BUTTON D
BUTTON A
BUTTON C
gs1
gs2
Who do you want to meet?
BUTTON B
BUTTON D
BUTTON A
BUTTON C

FIG.14

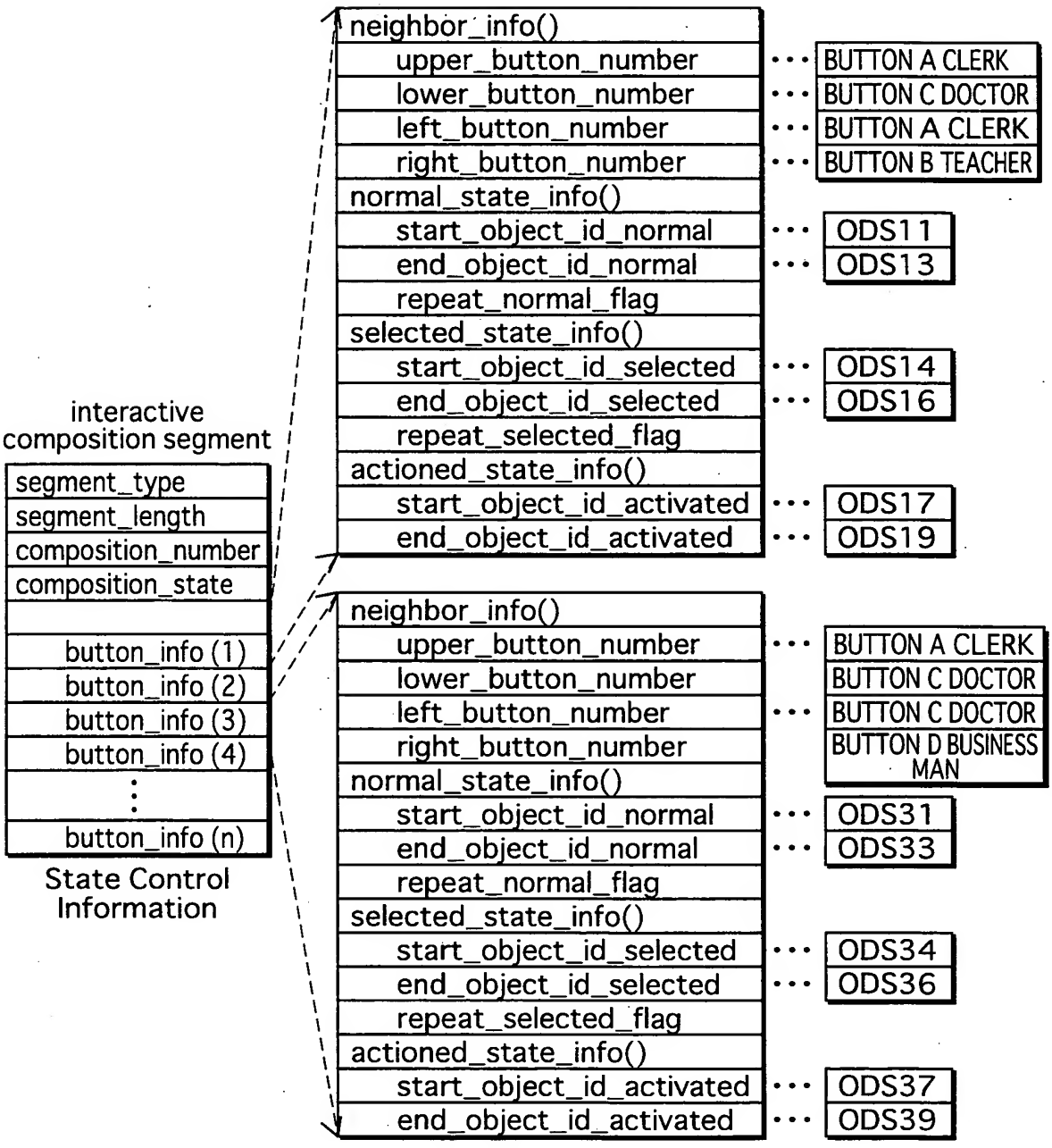

interactive composition segment
segment_type
segment_length
composition_number
composition_state
button_info (1)
button_info (2)
button_info (3)
button_info (4)
button_info (n)
State Control Information
neighbor_info()
upper_button_number
lower_button_number
left_button_number
right_button_number
normal_state_info()
start_object_id_normal
end_object_id_normal
repeat_normal_flag
selected_state_info()
start_object_id_selected
end_object_id_selected
repeat_selected_flag
actioned_state_info()
start_object_id_activated
end_object_id_activated
BUTTON A CLERK
BUTTON C DOCTOR
BUTTON A CLERK
BUTTON B TEACHER
ODS11
ODS13
ODS14
ODS16
ODS17
ODS19
neighbor_info()
upper_button_number
lower_button_number
left_button_number
right_button_number
normal_state_info()
start_object_id_normal
end_object_id_normal
repeat_normal_flag
selected_state_info()
start_object_id_selected
end_object_id_selected
repeat_selected_flag
actioned_state_info()
start_object_id_activated
end_object_id_activated
BUTTON A CLERK
BUTTON C DOCTOR
BUTTON C DOCTOR
BUTTON D BUSINESS MAN
ODS31
ODS33
ODS34
ODS36
ODS37
ODS39

FIG.15

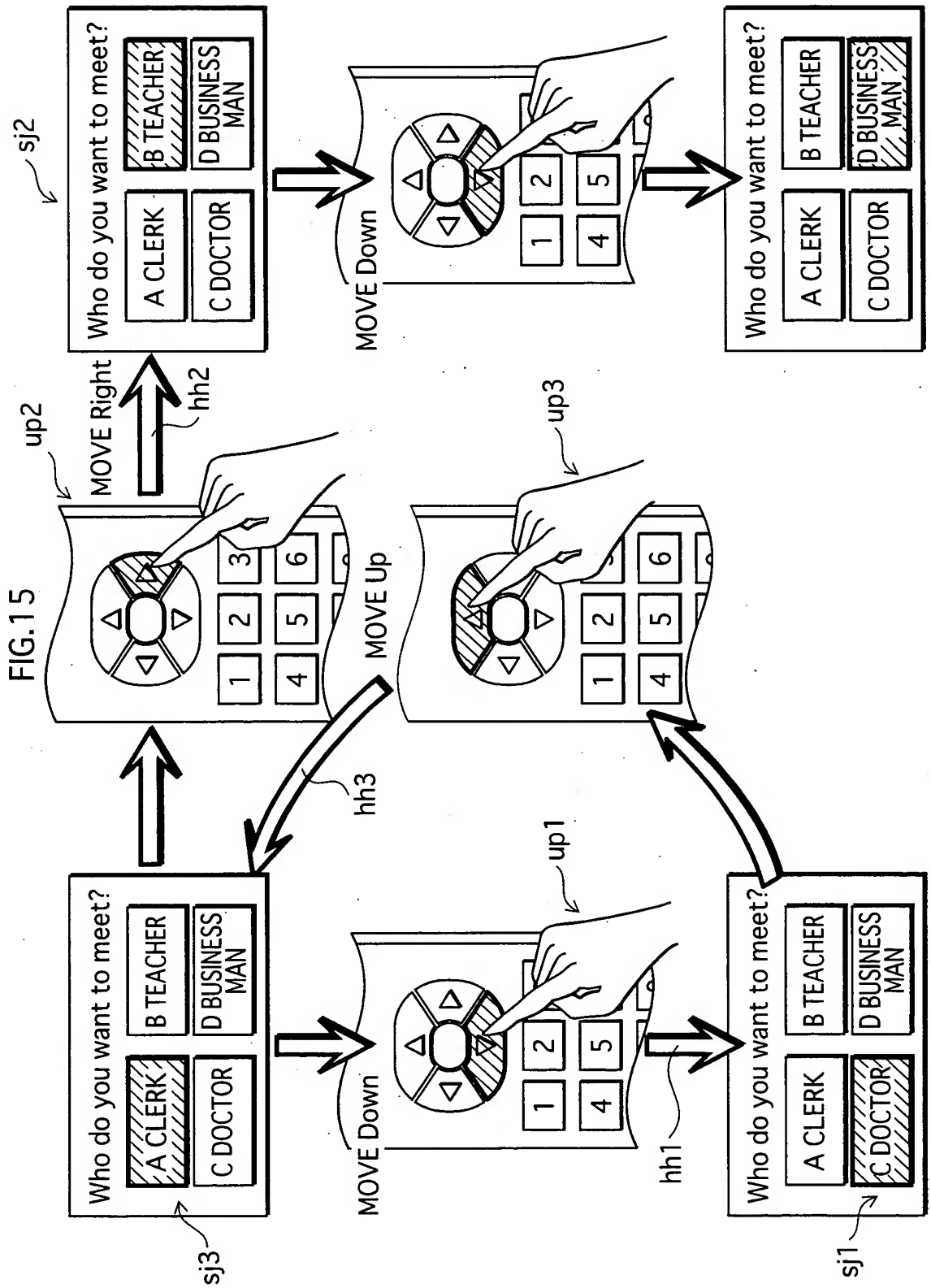

Who do you want to meet?
A CLERK
B TEACHER
C DOCTOR
D BUSINESS MAN
sj2
sj3
sj1
MOVE Right
MOVE Down
MOVE Up
hh1
hh2
hh3
up1
up2
up3
1
2
3
4
5
6

FIG.16

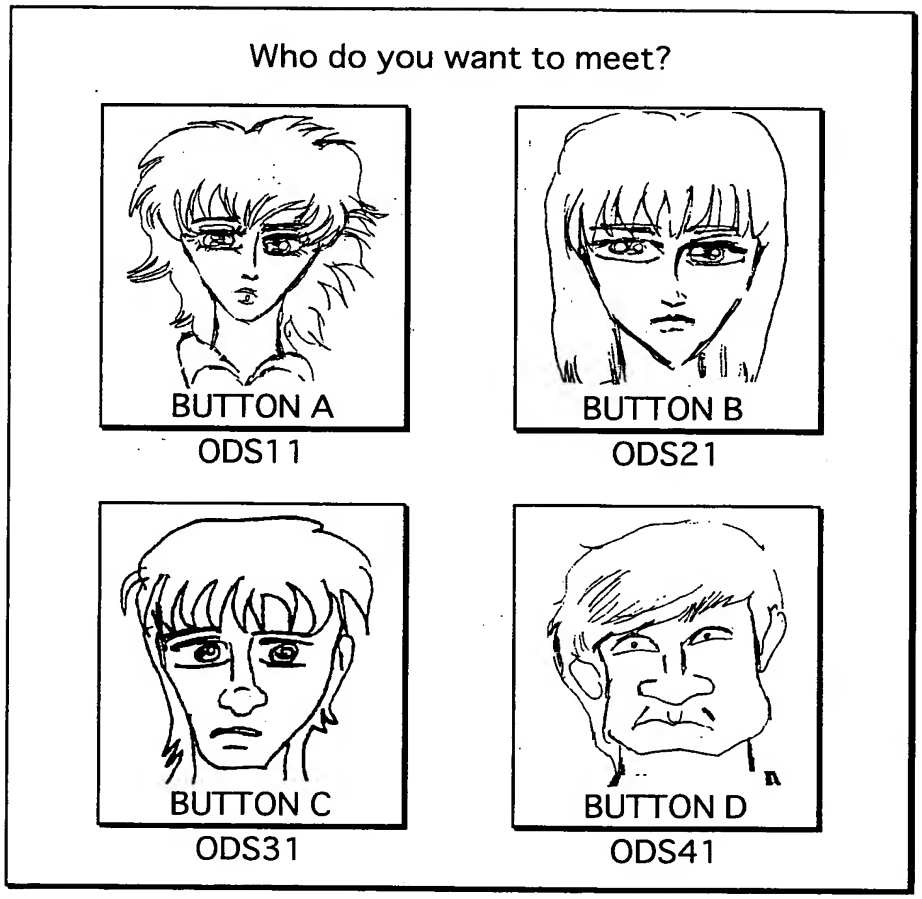

Who do you want to meet?
BUTTON A
ODS11
BUTTON B
ODS21
BUTTON C
ODS31
BUTTON D
ODS41

FIG.17

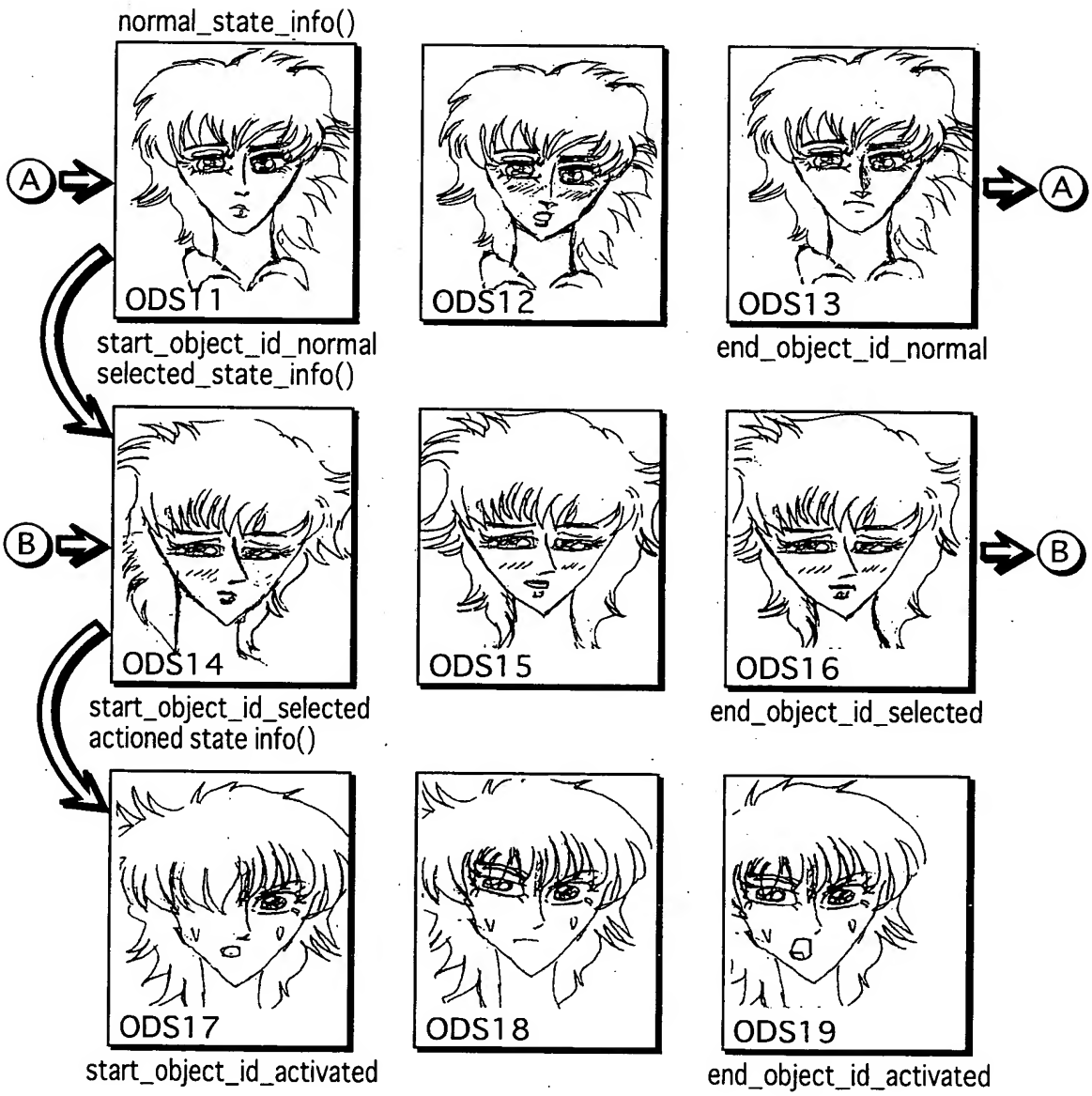

normal_state_info()
A
ODS11
ODS12
ODS13
A
start_object_id_normal
selected_state_info()
end_object_id_normal
B
ODS14
ODS15
ODS16
B
start_object_id_selected
actioned state info()
end_object_id_selected
ODS17
ODS18
ODS19
start_object_id_activated
end_object_id_activated

FIG.18

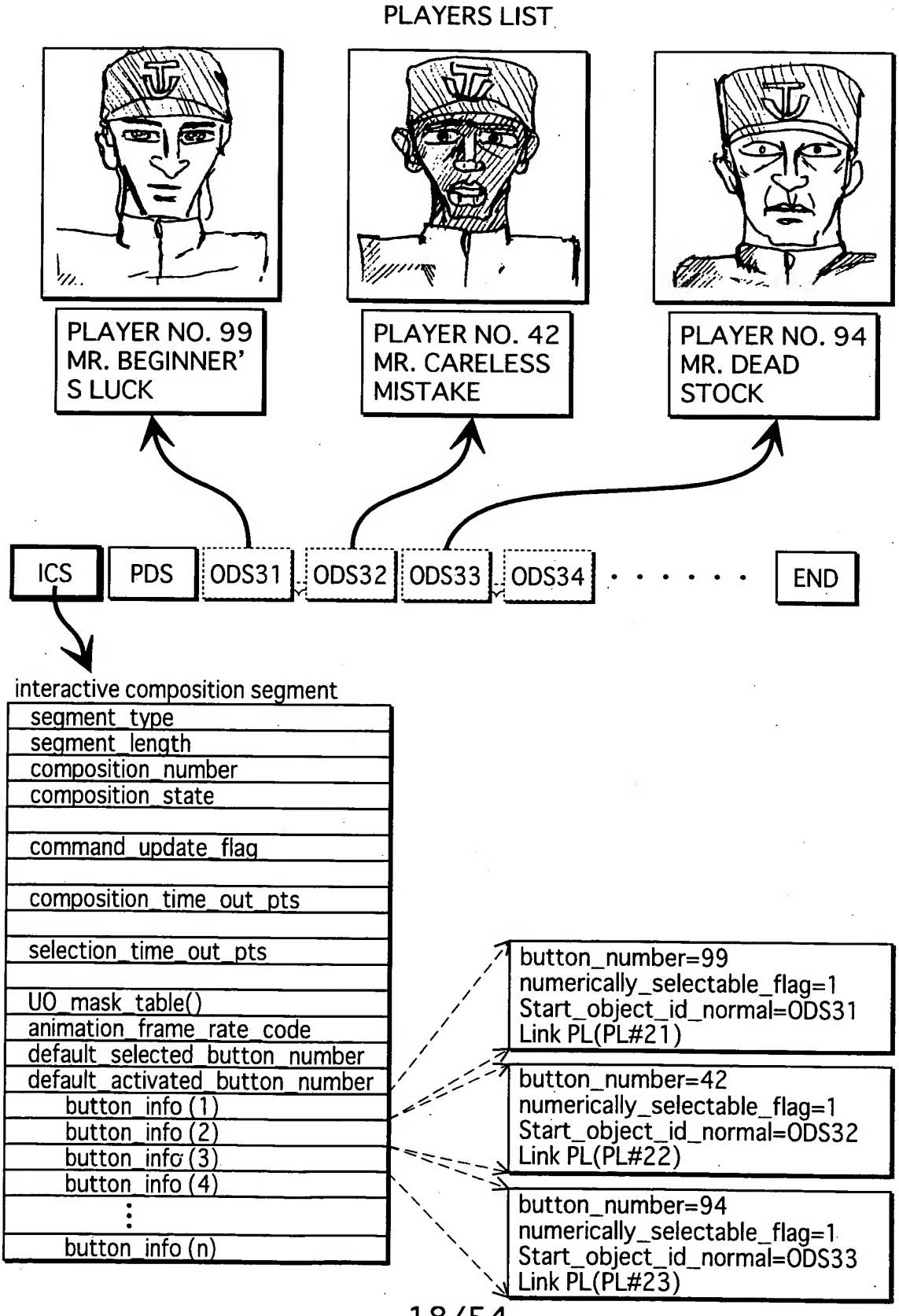

PLAYERS LIST
PLAYER NO. 99
MR. BEGINNER'
S LUCK
PLAYER NO. 42
MR. CARELESS
MISTAKE
PLAYER NO. 94
MR. DEAD
STOCK
ICS
PDS
ODS31
ODS32
ODS33
ODS34
END
interactive composition segment
segment_type
segment_length
composition_number
composition_state
command_update_flag
composition_time_out_pts
selection_time_out_pts
UO_mask_table()
animation_frame_rate_code
default_selected_button_number
default_activated_button_number
button_info (1)
button_info (2)
button_info (3)
button_info (4)
button_info (n)
button_number=99
numerically_selectable_flag=1
Start_object_id_normal=ODS31
Link PL(PL#21)
button_number=42
numerically_selectable_flag=1
Start_object_id_normal=ODS32
Link PL(PL#22)
button_number=94
numerically_selectable_flag=1
Start_object_id_normal=ODS33
Link PL(PL#23)

FIG.19

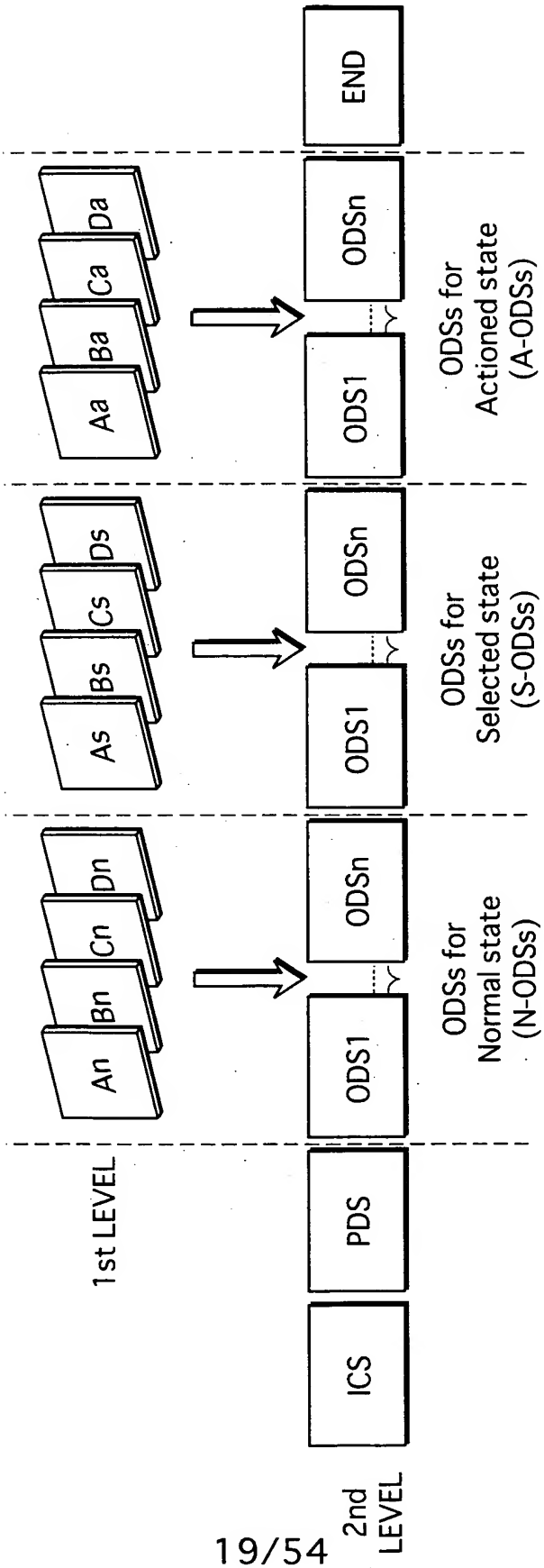

ICS
PDS
ODS1
ODSn
ODSs for Normal state (N-ODSs)
ODS1
ODSn
ODSs for Selected state (S-ODSs)
ODS1
ODSn
ODSs for Actioned state (A-ODSs)
END
An
Bn
Cn
Dn
As
Bs
Cs
Ds
Aa
Ba
Ca
Da
1st LEVEL
2nd LEVEL

FIG.20

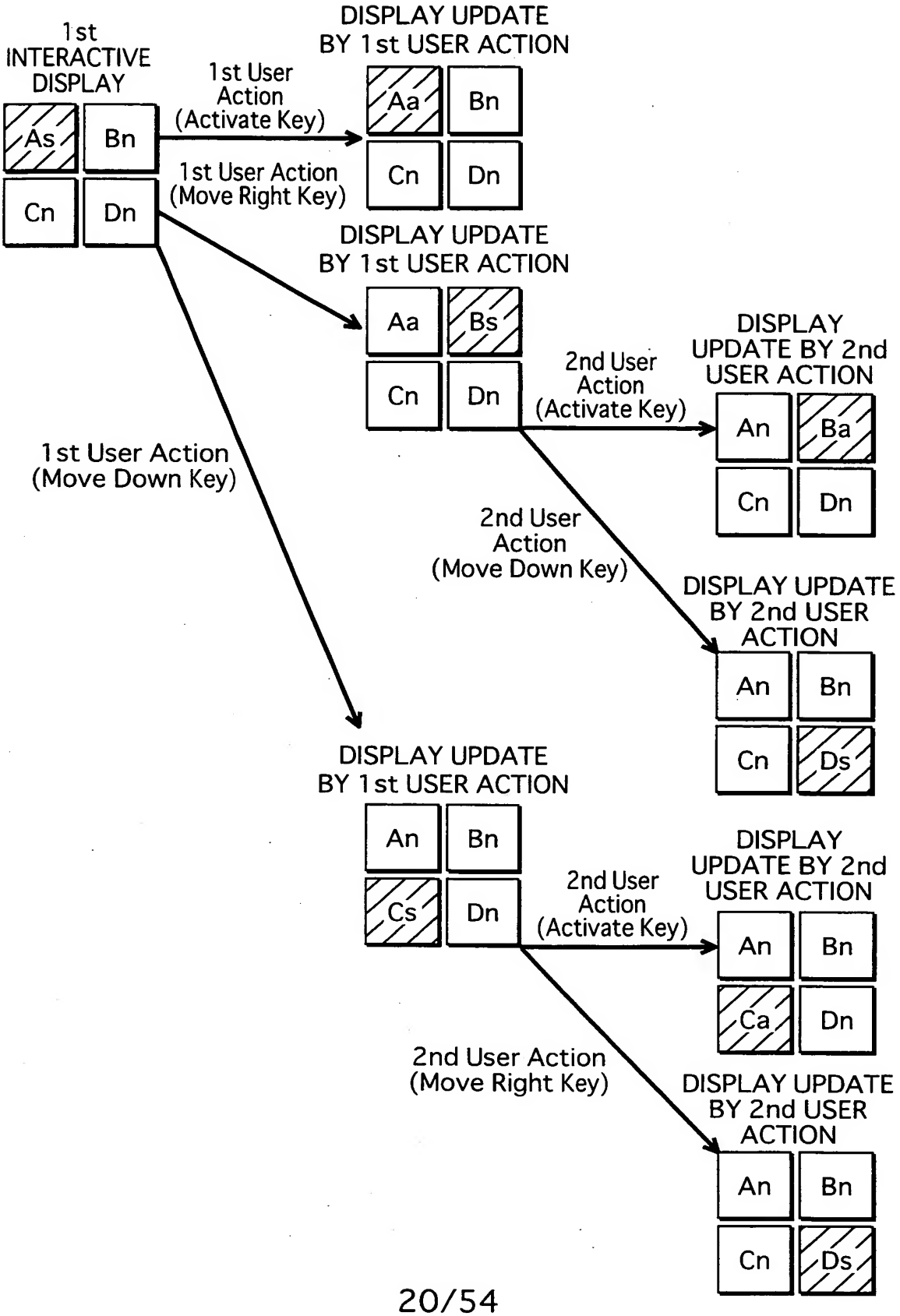

1st INTERACTIVE DISPLAY
As
Bn
Cn
Dn
1st User Action (Activate Key)
1st User Action (Move Right Key)
1st User Action (Move Down Key)
DISPLAY UPDATE BY 1st USER ACTION
Aa
Bn
Cn
Dn
DISPLAY UPDATE BY 1st USER ACTION
Aa
Bs
Cn
Dn
2nd User Action (Activate Key)
DISPLAY UPDATE BY 2nd USER ACTION
An
Ba
Cn
Dn
2nd User Action (Move Down Key)
DISPLAY UPDATE BY 2nd USER ACTION
An
Bn
Cn
Ds
DISPLAY UPDATE BY 1st USER ACTION
An
Bn
Cs
Dn
2nd User Action (Activate Key)
DISPLAY UPDATE BY 2nd USER ACTION
An
Bn
Ca
Dn
2nd User Action (Move Right Key)
DISPLAY UPDATE BY 2nd USER ACTION
An
Bn
Cn
Ds

FIG.21

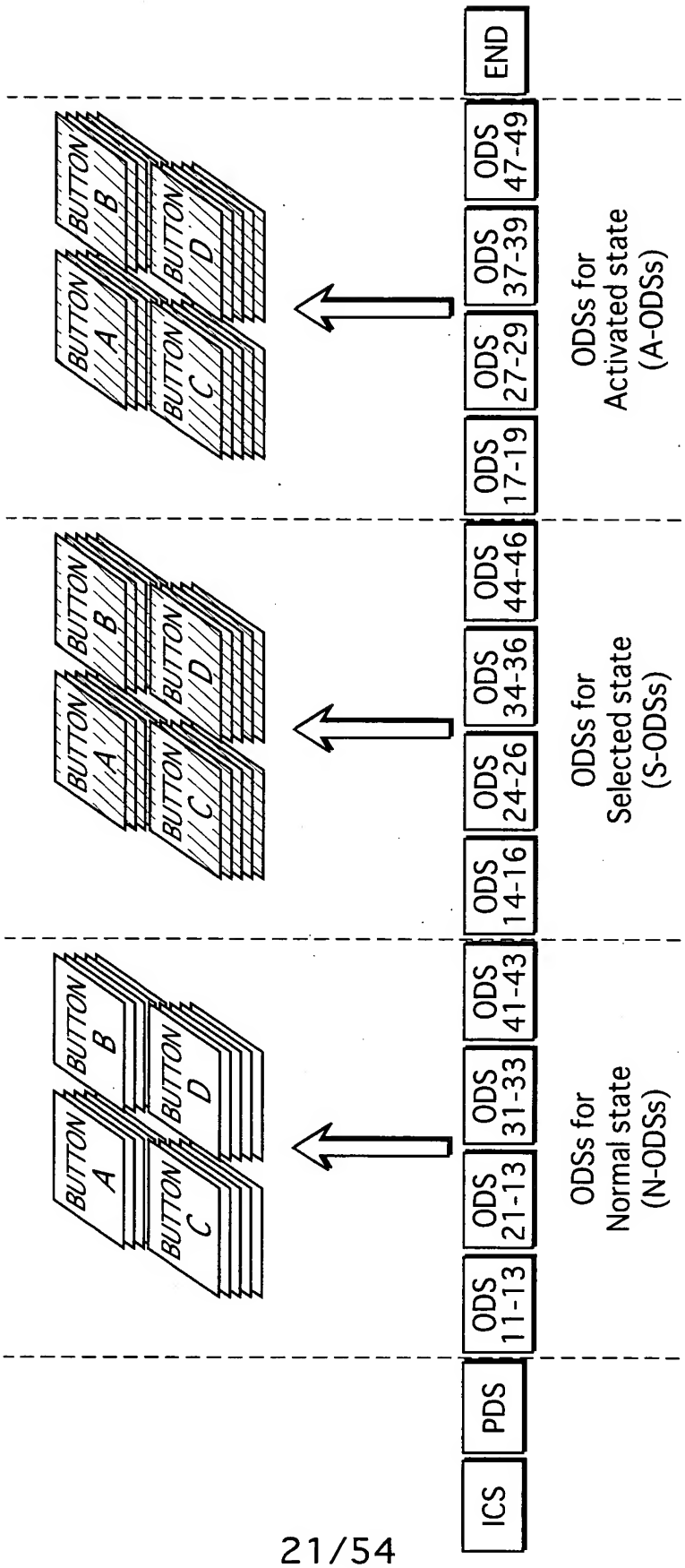

ICS
PDS
ODS 11-13
ODS 21-13
ODS 31-33
ODS 41-43
ODS 14-16
ODS 24-26
ODS 34-36
ODS 44-46
ODS 17-19
ODS 27-29
ODS 37-39
ODS 47-49
END
BUTTON A
BUTTON B
BUTTON C
BUTTON D
ODSs for Normal state (N-ODSs)
ODSs for Selected state (S-ODSs)
ODSs for Activated state (A-ODSs)

FIG.22

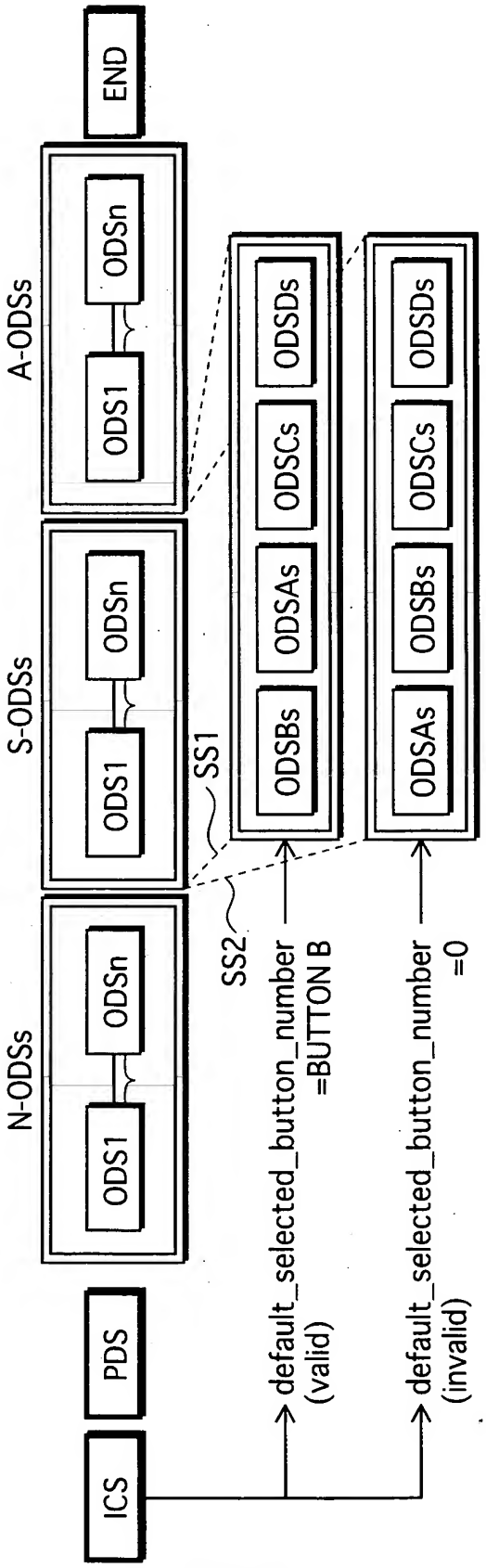

ICS
PDS
N-ODSs
ODS1
ODSn
S-ODSs
ODS1
ODSn
A-ODSs
ODS1
ODSn
END
SS1
SS2
ODSBs
ODSAs
ODSCs
ODSDs
ODSAs
ODSBs
ODSCs
ODSDs
default_selected_button_number
=BUTTON B
(valid)
default_selected_button_number
=0
(invalid)

FIG.23A

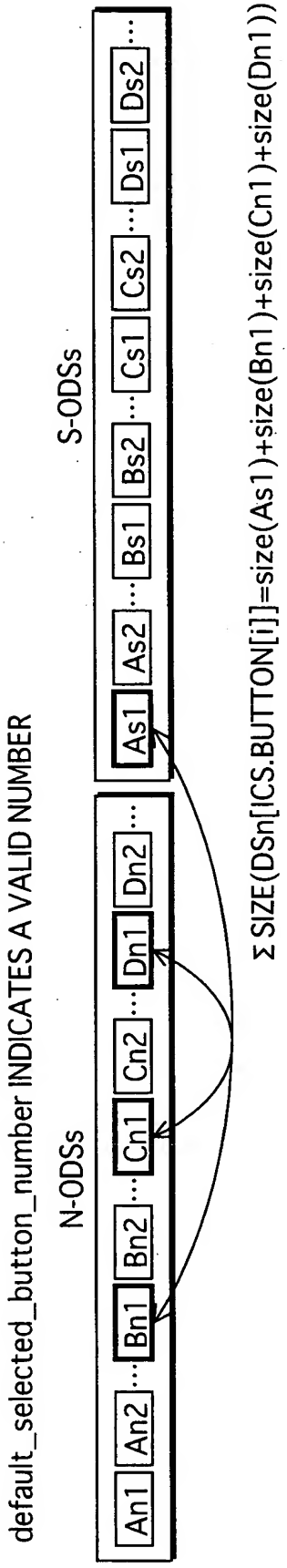


FIG.23B

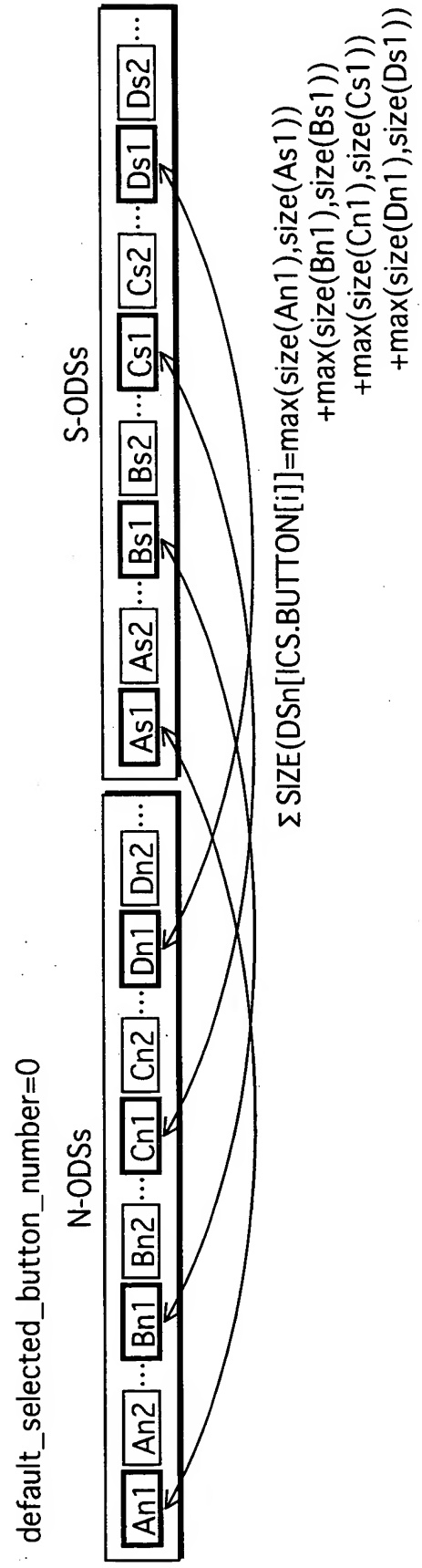


FIG.24

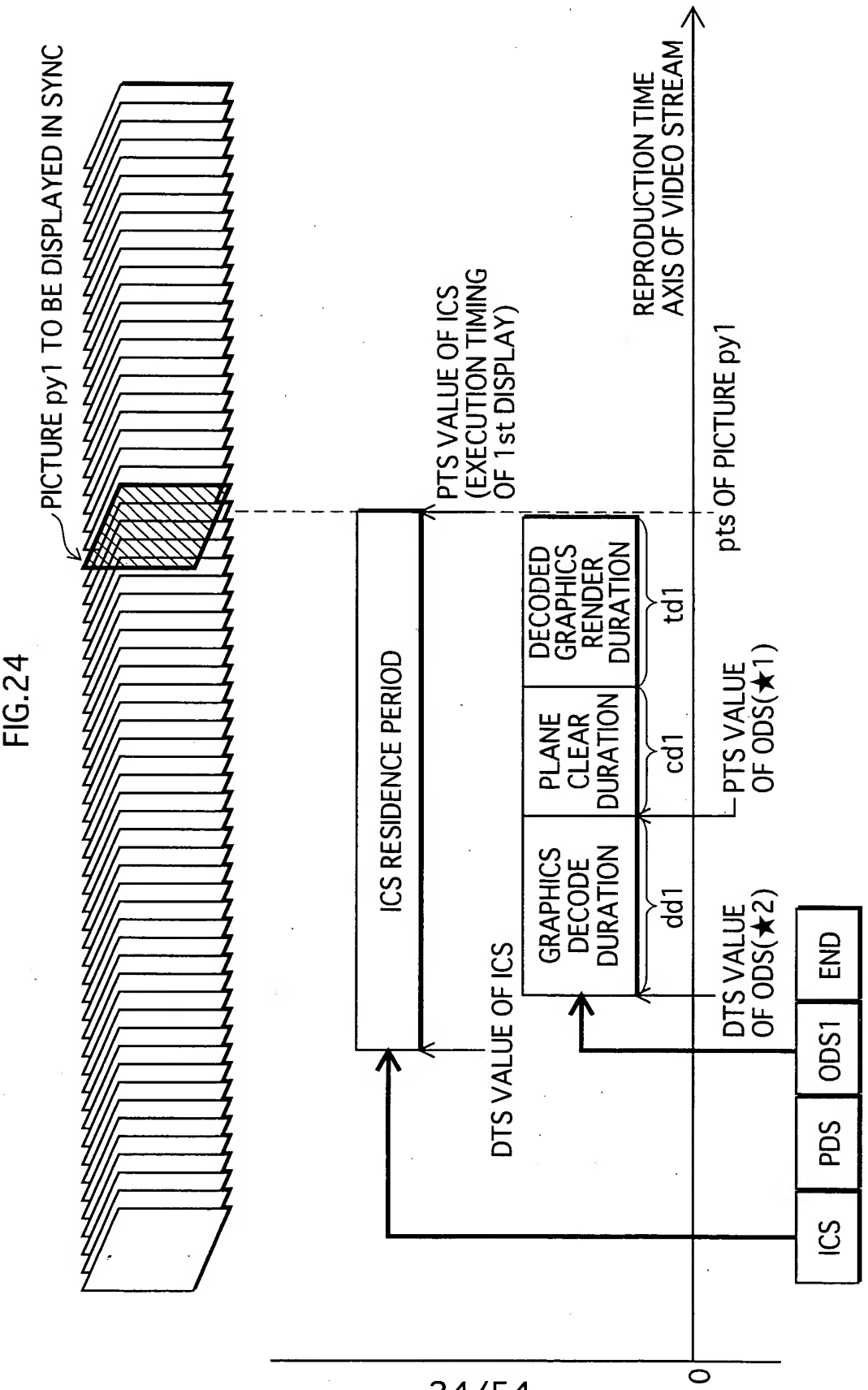

PICTURE py1 TO BE DISPLAYED IN SYNC
REPRODUCTION TIME AXIS OF VIDEO STREAM
PTS VALUE OF ICS (EXECUTION TIMING OF 1st DISPLAY)
pts OF PICTURE py1
ICS RESIDENCE PERIOD
DECODED GRAPHICS RENDER DURATION
PLANE CLEAR DURATION
GRAPHICS DECODE DURATION
td1
cd1
dd1
PTS VALUE OF ODS(★1)
DTS VALUE OF ODS(★2)
DTS VALUE OF ICS
ICS
PDS
ODS1
END
0

FIG.25

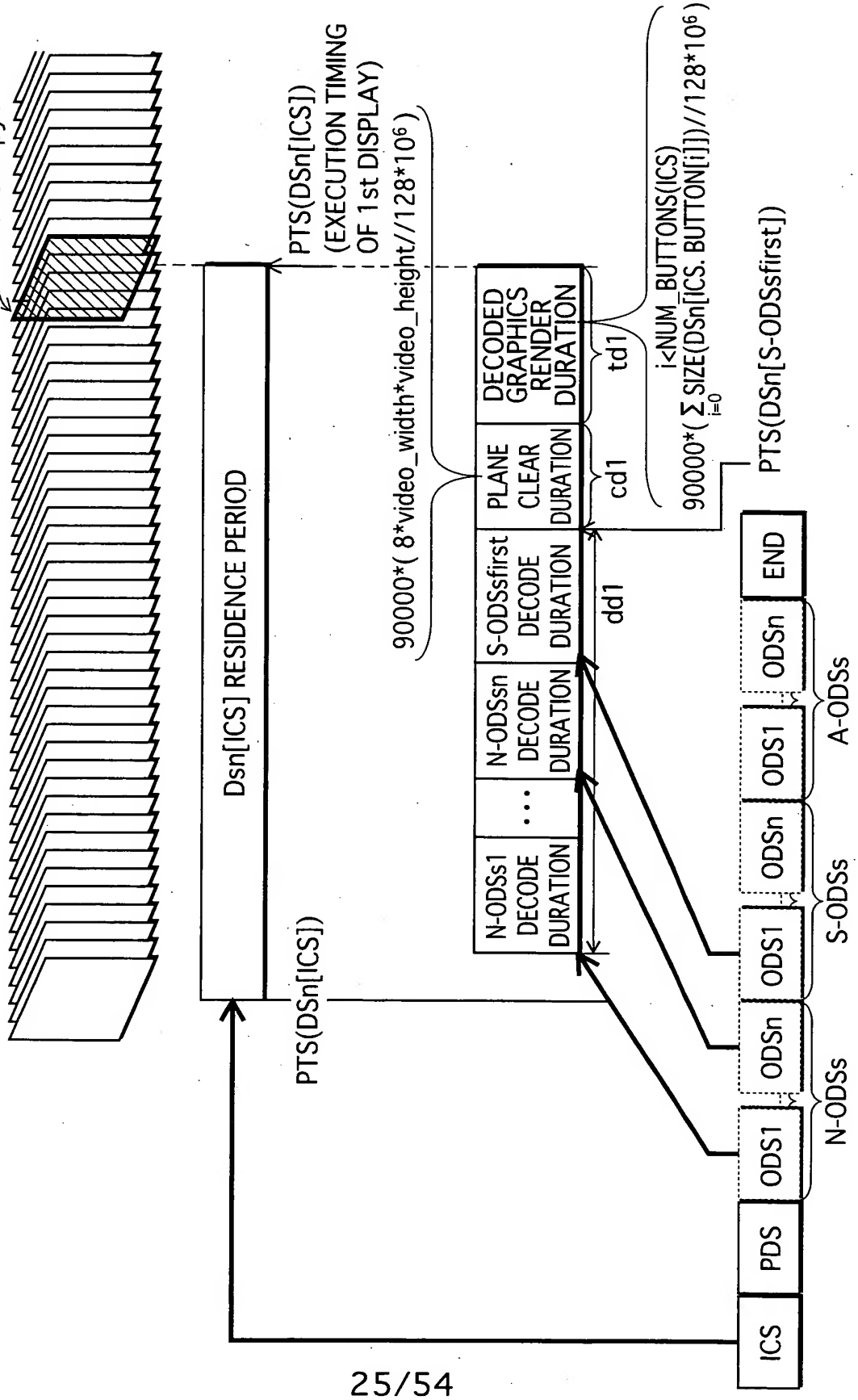

PICTURE py1
PTS(DSn[ICS])
(EXECUTION TIMING
OF 1st DISPLAY)
90000*(8*video_width*video_height//128*10^6)
90000*(Σ i<NUM_BUTTONS(ICS) SIZE(DSn[ICS. BUTTON[i]])//128*10^6)
PTS(DSn[S-ODSsfirst])
Dsn[ICS] RESIDENCE PERIOD
PTS(DSn[ICS])
N-ODSs1 DECODE DURATION
...
N-ODSsn DECODE DURATION
S-ODSsfirst DECODE DURATION
PLANE CLEAR DURATION
DECODED GRAPHICS RENDER DURATION
dd1
cd1
td1
ICS
PDS
ODS1
ODSn
ODS1
ODSn
ODS1
ODSn
END
N-ODSs
S-ODSs
A-ODSs

FIG.26

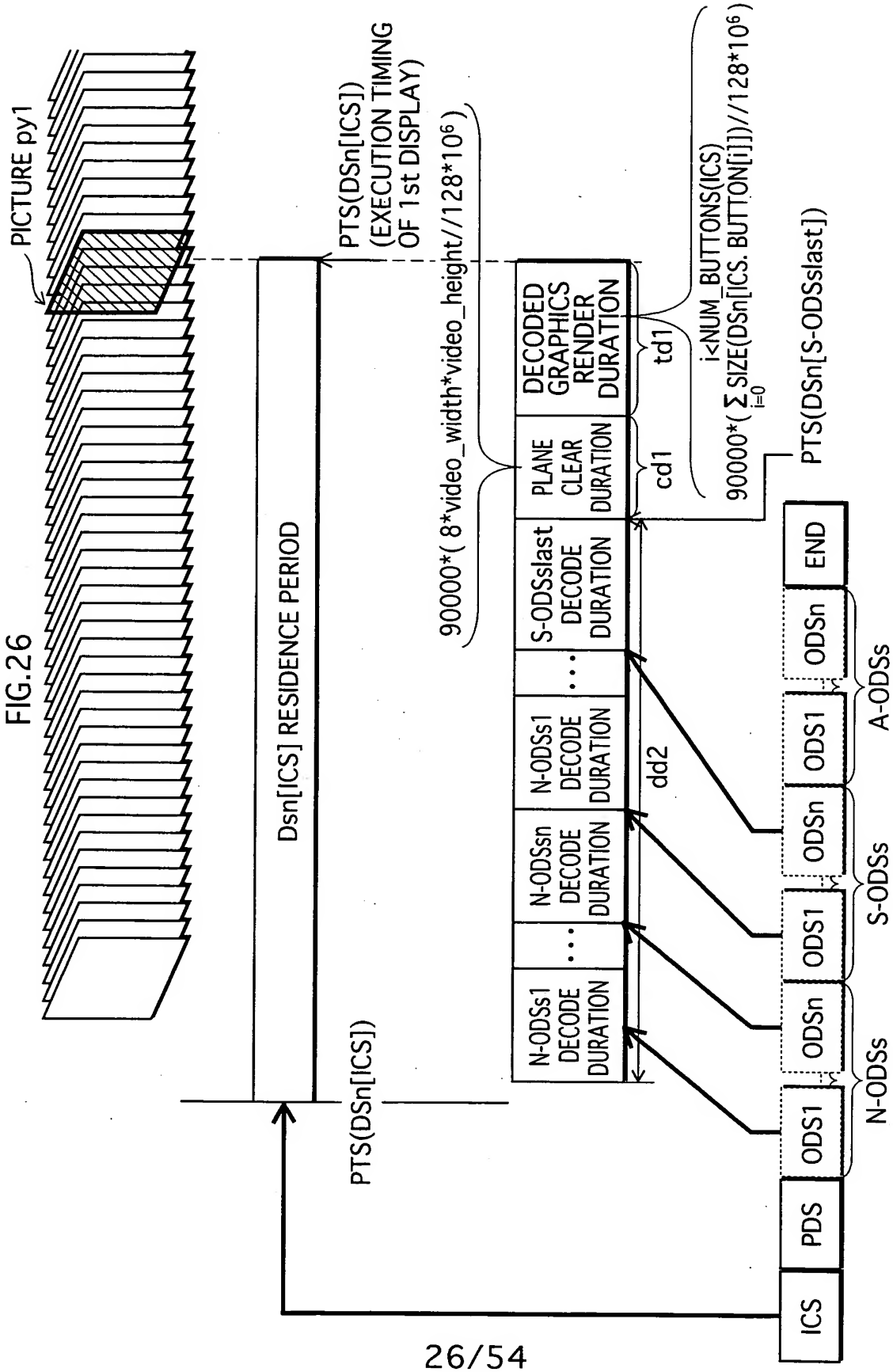

PICTURE py1
PTS(DSn[ICS])
(EXECUTION TIMING
OF 1st DISPLAY)
Dsn[ICS] RESIDENCE PERIOD
PTS(DSn[ICS])
90000*(8*video_width*video_height//128*10^6)
DECODED GRAPHICS RENDER DURATION
PLANE CLEAR DURATION
S-ODSslast DECODE DURATION
N-ODSs1 DECODE DURATION
N-ODSsn DECODE DURATION
td1
cd1
dd2
90000*(Σ i=0 i<NUM_BUTTONS(ICS) SIZE(DSn[ICS. BUTTON[i]])//128*10^6)
PTS(DSn[S-ODSslast])
ICS
PDS
ODS1
ODSn
ODS1
ODSn
ODS1
ODSn
END
N-ODSs
S-ODSs
A-ODSs

FIG.27

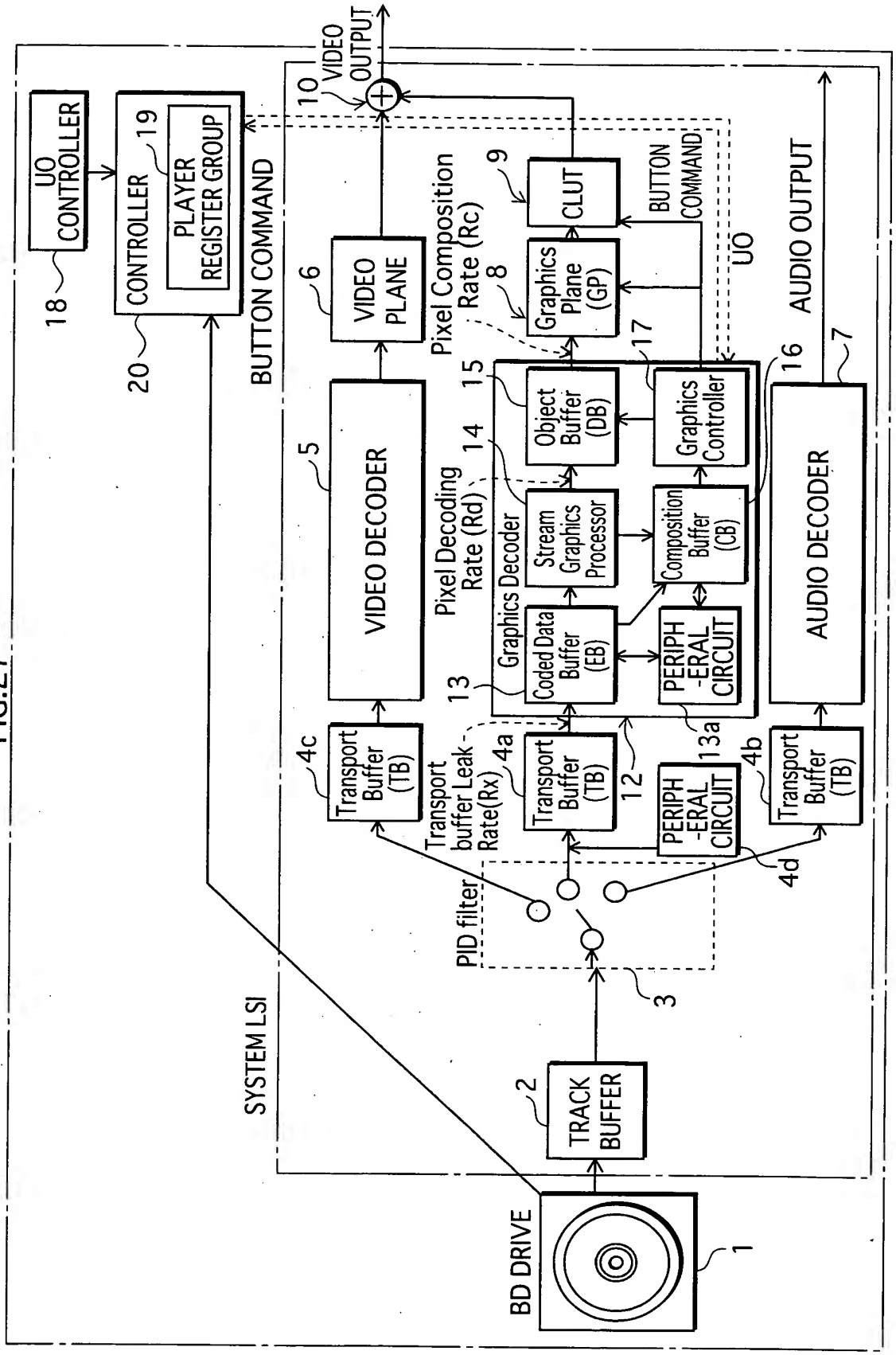

BD DRIVE
1
SYSTEM LSI
TRACK BUFFER
2
PID filter
3
Transport Buffer (TB)
4a
4b
4c
4d
Transport buffer Leak Rate(Rx)
PERIPH -ERAL CIRCUIT
12
13
13a
Graphics Decoder
Coded Data Buffer (EB)
Stream Graphics Processor
Object Buffer (DB)
Composition Buffer (CB)
Graphics Controller
Pixel Decoding Rate (Rd)
14
15
16
17
VIDEO DECODER
5
VIDEO PLANE
6
AUDIO DECODER
7
AUDIO OUTPUT
Graphics Plane (GP)
8
Pixel Composition Rate (Rc)
CLUT
9
VIDEO OUTPUT
10
BUTTON COMMAND
UO
UO CONTROLLER
18
CONTROLLER
19
PLAYER REGISTER GROUP
20

FIG.28

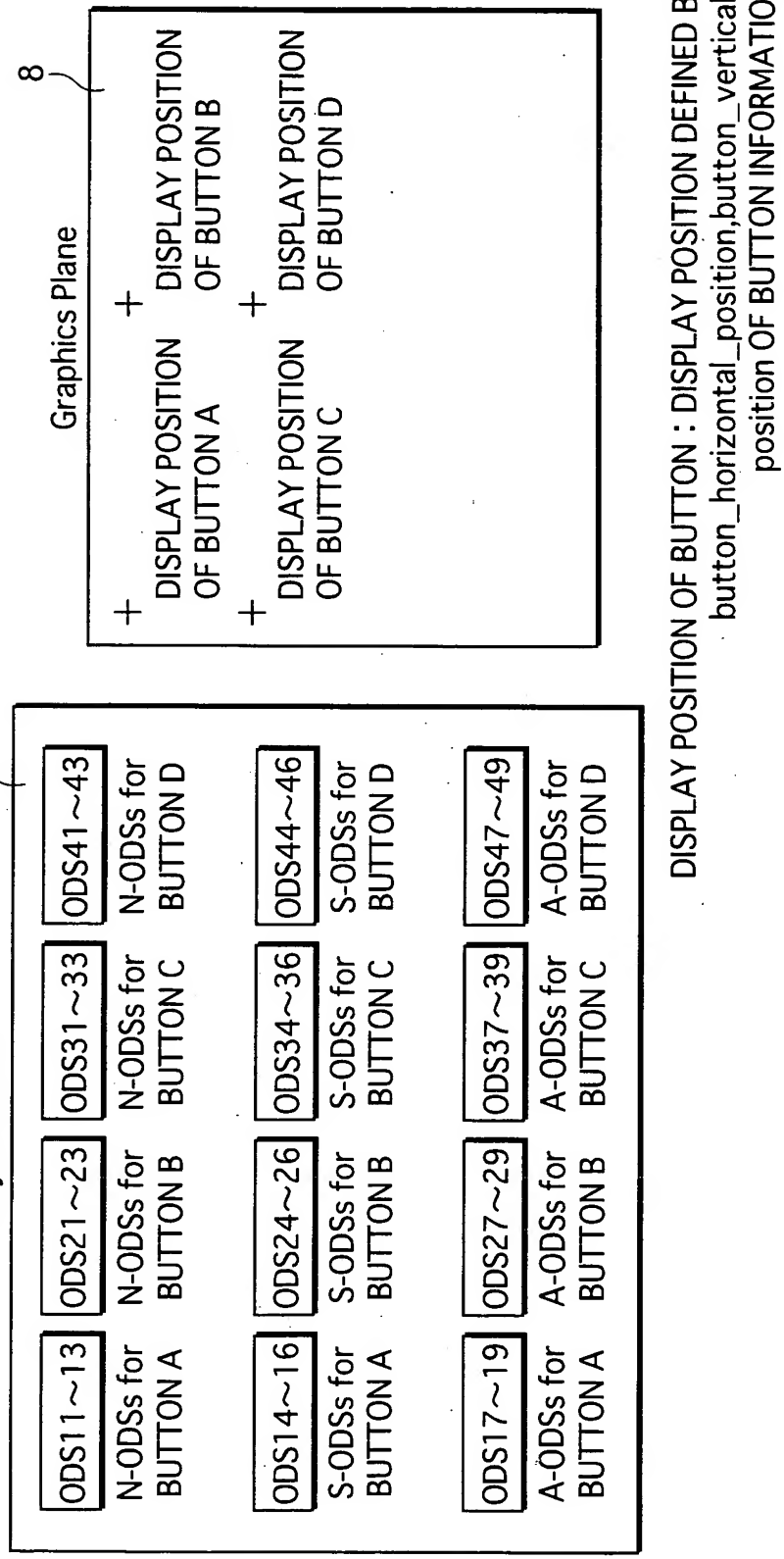

15
Object Buffer
ODS11~13
N-ODSs for BUTTON A
ODS21~23
N-ODSs for BUTTON B
ODS31~33
N-ODSs for BUTTON C
ODS41~43
N-ODSs for BUTTON D
ODS14~16
S-ODSs for BUTTON A
ODS24~26
S-ODSs for BUTTON B
ODS34~36
S-ODSs for BUTTON C
ODS44~46
S-ODSs for BUTTON D
ODS17~19
A-ODSs for BUTTON A
ODS27~29
A-ODSs for BUTTON B
ODS37~39
A-ODSs for BUTTON C
ODS47~49
A-ODSs for BUTTON D
8
Graphics Plane
+
DISPLAY POSITION OF BUTTON A
+
DISPLAY POSITION OF BUTTON B
+
DISPLAY POSITION OF BUTTON C
+
DISPLAY POSITION OF BUTTON D
DISPLAY POSITION OF BUTTON : DISPLAY POSITION DEFINED BY button_horizontal_position,button_vertical_position OF BUTTON INFORMATION

FIG.29

WRITING OPERATION OF Graphics Controller AT INITIAL DISPLAY

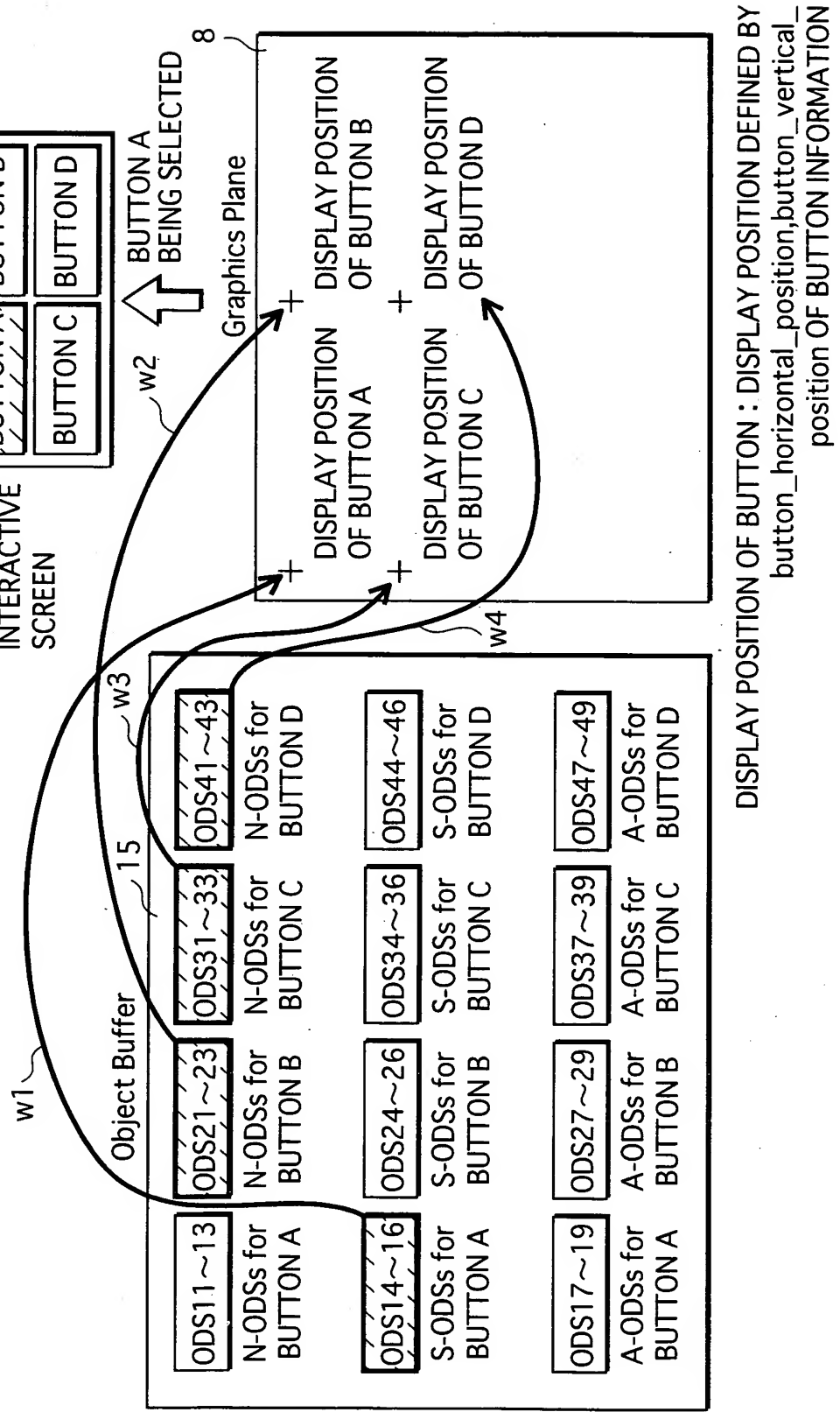


FIG.30
WRITING OPERATION OF Graphics Controller AT INTERACTIVE SCREEN UPDATE ACCORDING TO 1st User Action(Move Right)

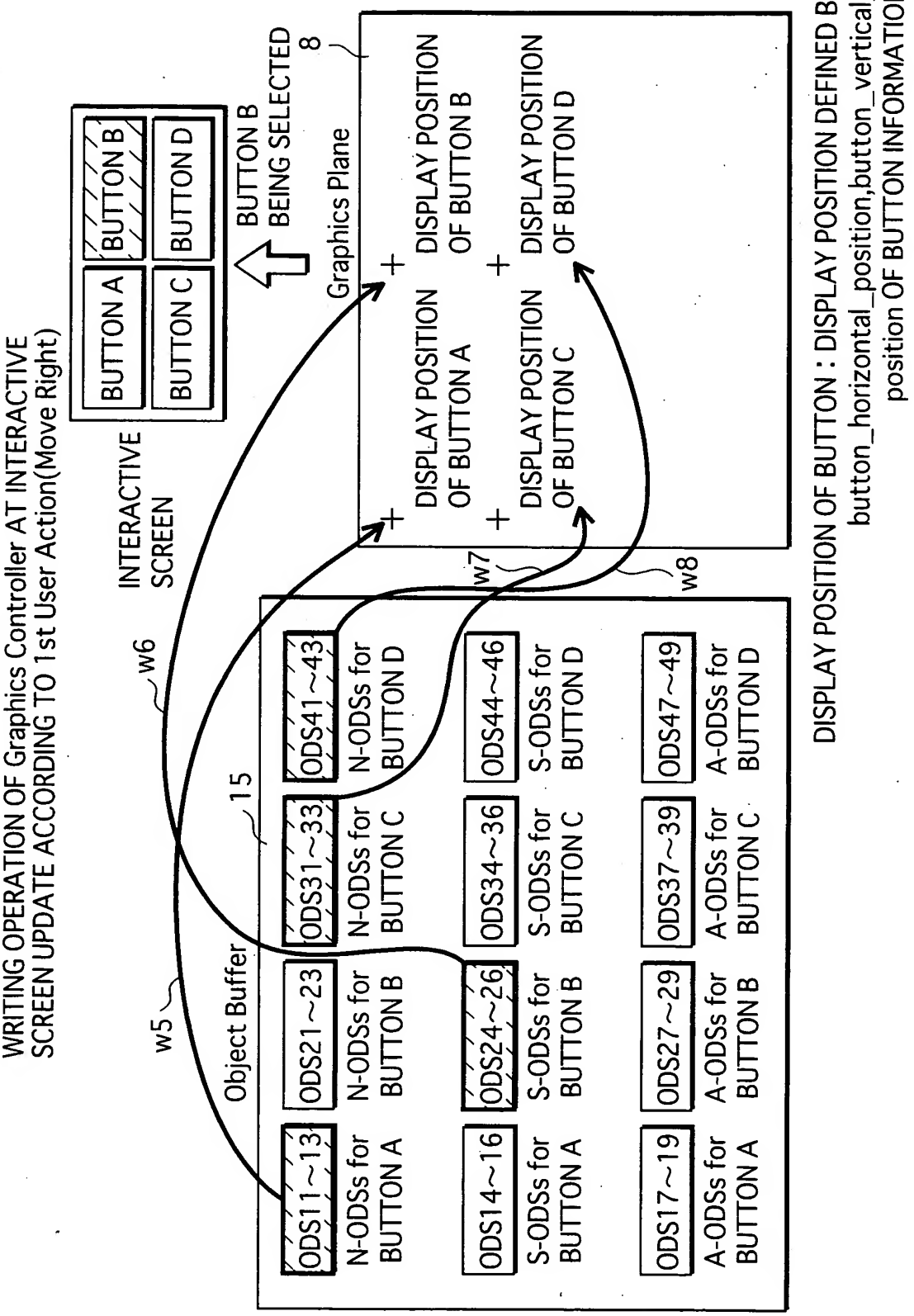


FIG.31
WRITING OPERATION OF Graphics Controller AT INTERACTIVE SCREEN UPDATE ACCORDING TO 1st User Action(Move Down)

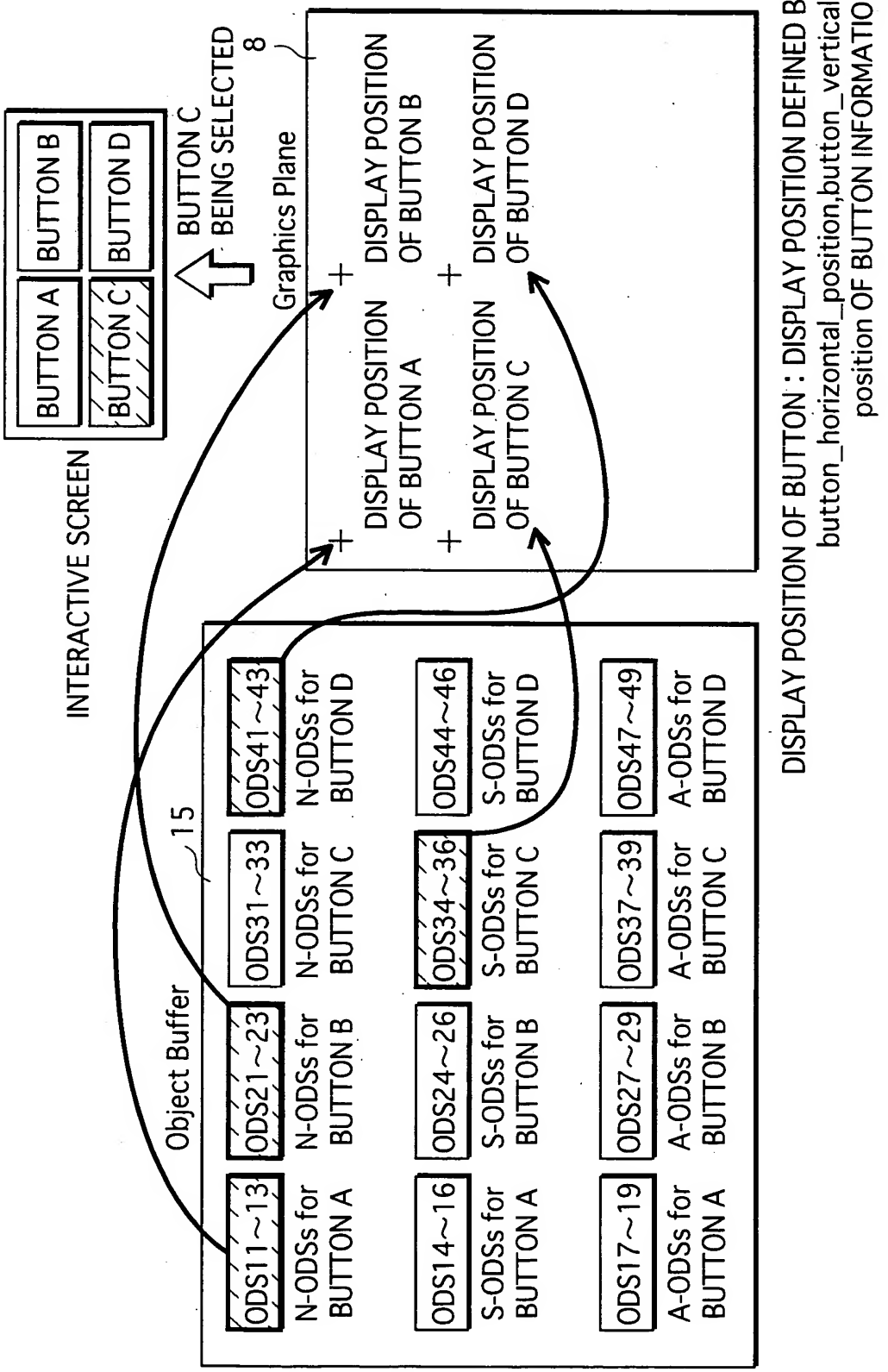


FIG.32
WRITING OPERATION OF Graphics Controller AT INTERACTIVE SCREEN UPDATE ACCORDING TO 1st User Action(Activated)

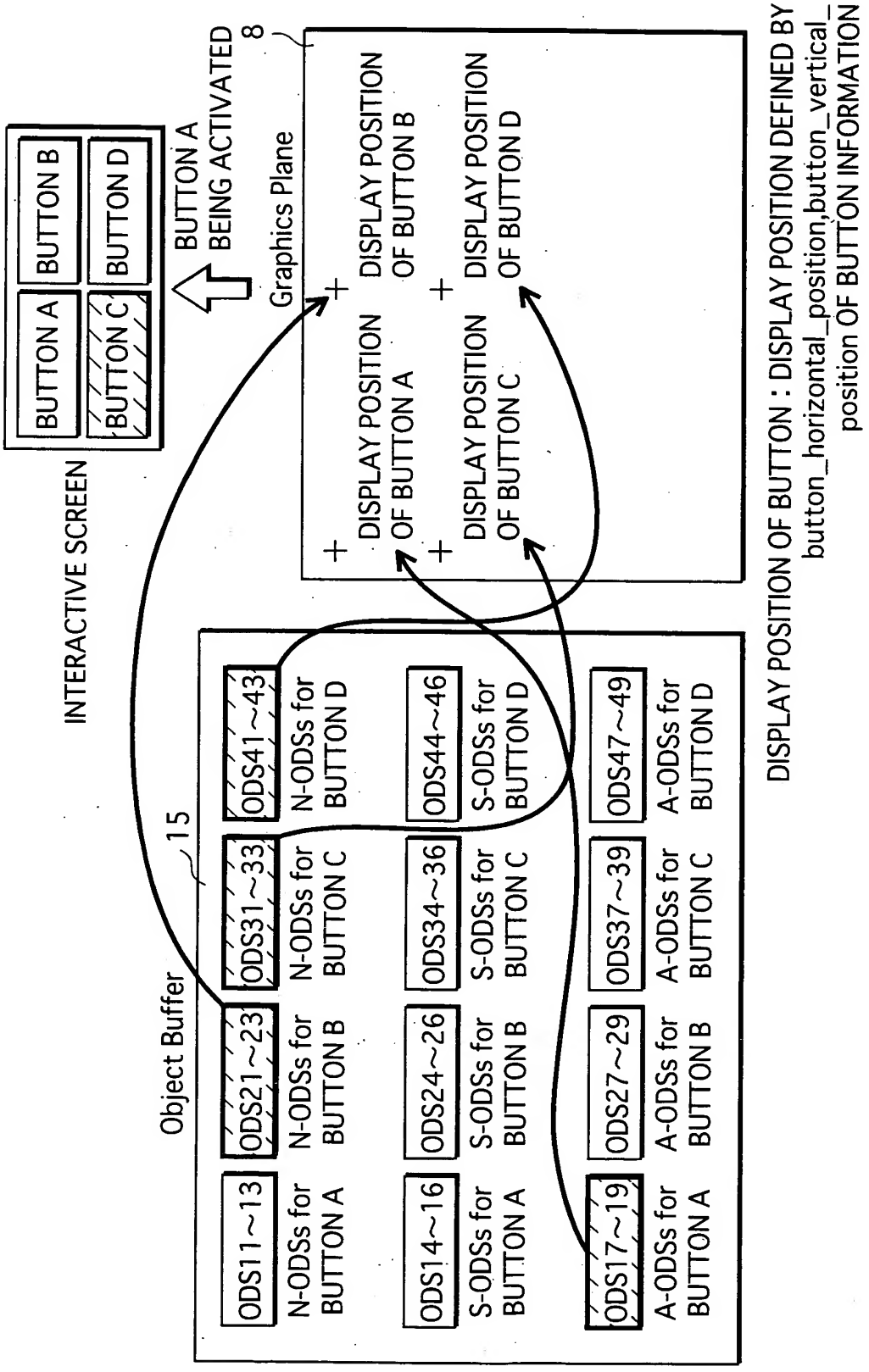


FIG.33

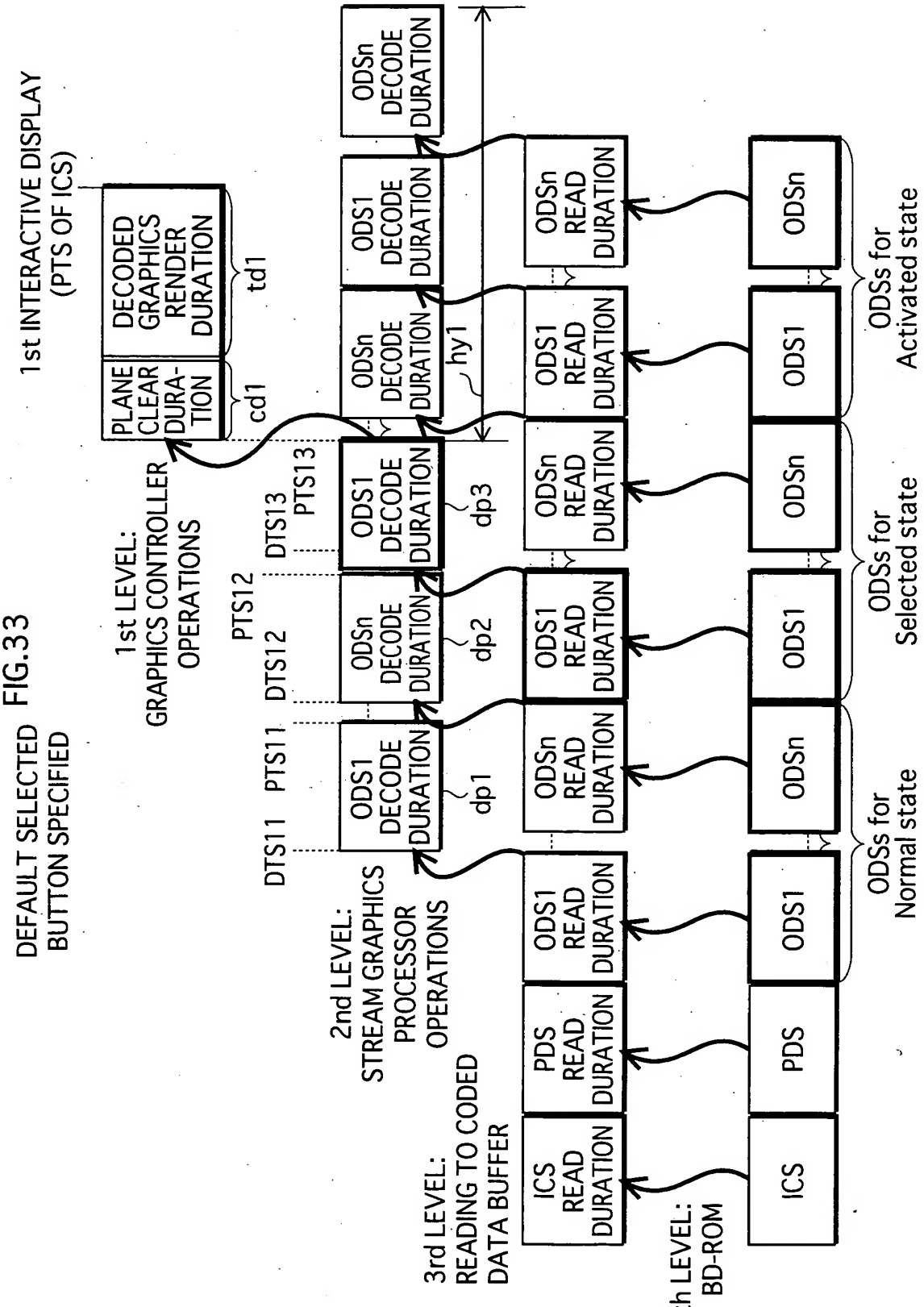

DEFAULT SELECTED BUTTON SPECIFIED
1st INTERACTIVE DISPLAY (PTS OF ICS)
PLANE CLEAR DURA-TION
DECODED GRAPHICS RENDER DURATION
td1
cd1
1st LEVEL: GRAPHICS CONTROLLER OPERATIONS
PTS12
DTS13
PTS13
DTS11
PTS11
DTS12
ODS1 DECODE DURATION
ODSn DECODE DURATION
dp1
dp2
dp3
hy1
2nd LEVEL: STREAM GRAPHICS PROCESSOR OPERATIONS
ODS1 READ DURATION
ODSn READ DURATION
3rd LEVEL: READING TO CODED DATA BUFFER
ICS READ DURATION
PDS READ DURATION
4th LEVEL: BD-ROM
ICS
PDS
ODS1
ODSn
ODSs for Normal state
ODSs for Selected state
ODSs for Activated state

FIG.34

DEFAULT SELECTED
BUTTON NOT SPECIFIED

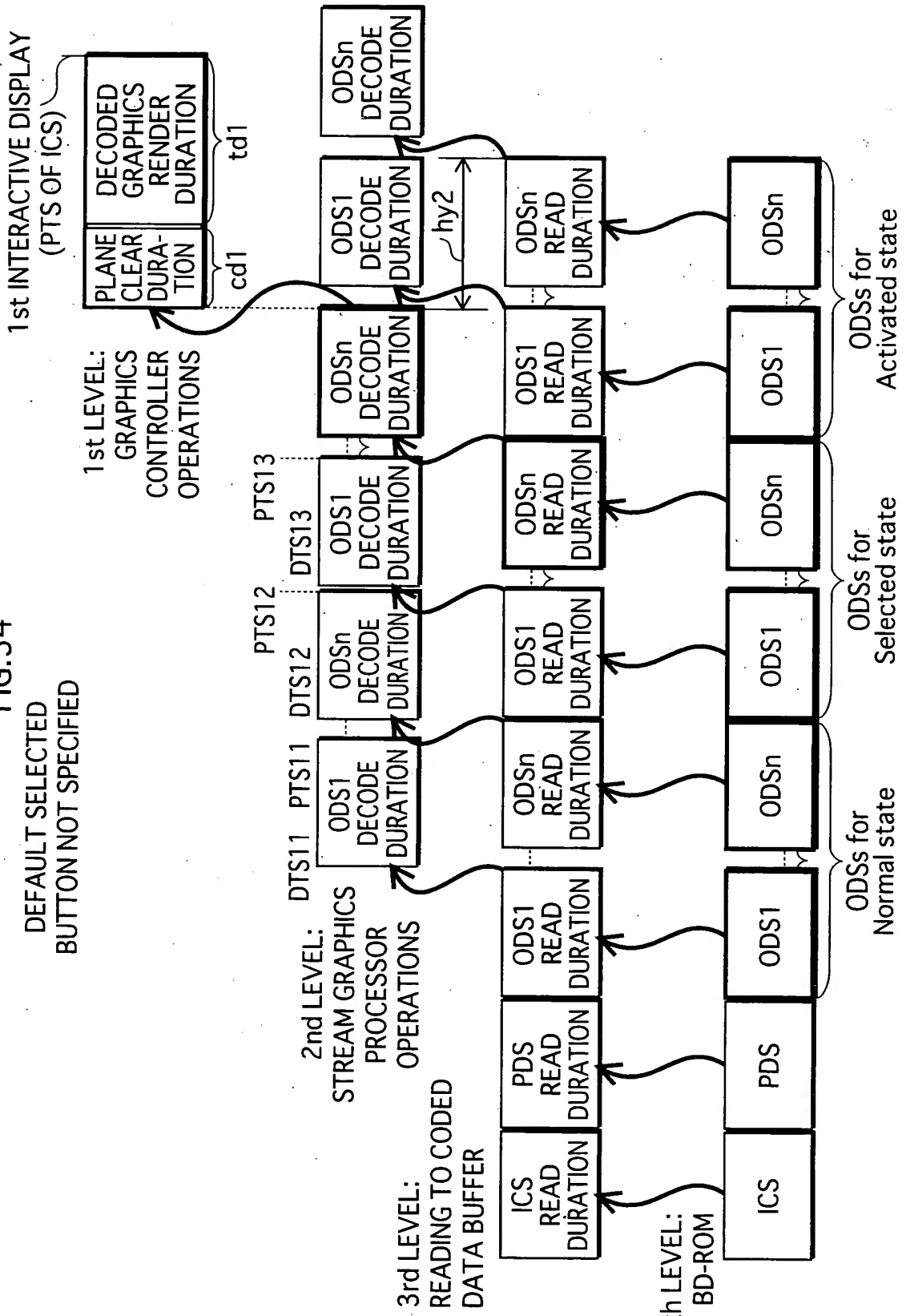


FIG.35

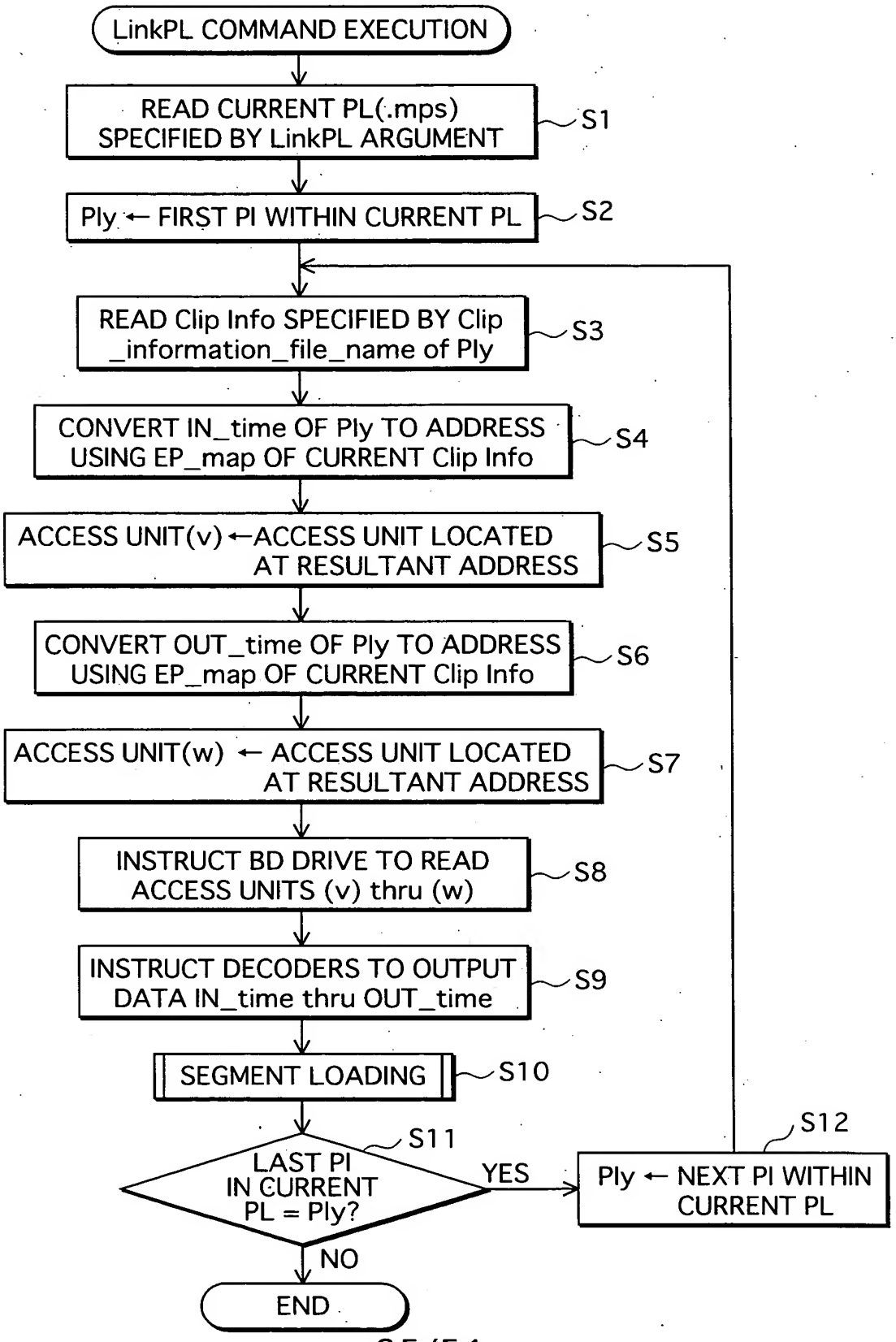

LinkPL COMMAND EXECUTION
READ CURRENT PL(.mps) SPECIFIED BY LinkPL ARGUMENT
S1
Ply ← FIRST PI WITHIN CURRENT PL
S2
READ Clip Info SPECIFIED BY Clip _information_file_name of Ply
S3
CONVERT IN_time OF Ply TO ADDRESS USING EP_map OF CURRENT Clip Info
S4
ACCESS UNIT(v) ←ACCESS UNIT LOCATED AT RESULTANT ADDRESS
S5
CONVERT OUT_time OF Ply TO ADDRESS USING EP_map OF CURRENT Clip Info
S6
ACCESS UNIT(w) ← ACCESS UNIT LOCATED AT RESULTANT ADDRESS
S7
INSTRUCT BD DRIVE TO READ ACCESS UNITS (v) thru (w)
S8
INSTRUCT DECODERS TO OUTPUT DATA IN_time thru OUT_time
S9
SEGMENT LOADING
S10
LAST PI IN CURRENT PL = Ply?
S11
YES
Ply ← NEXT PI WITHIN CURRENT PL
S12
NO
END

FIG.36

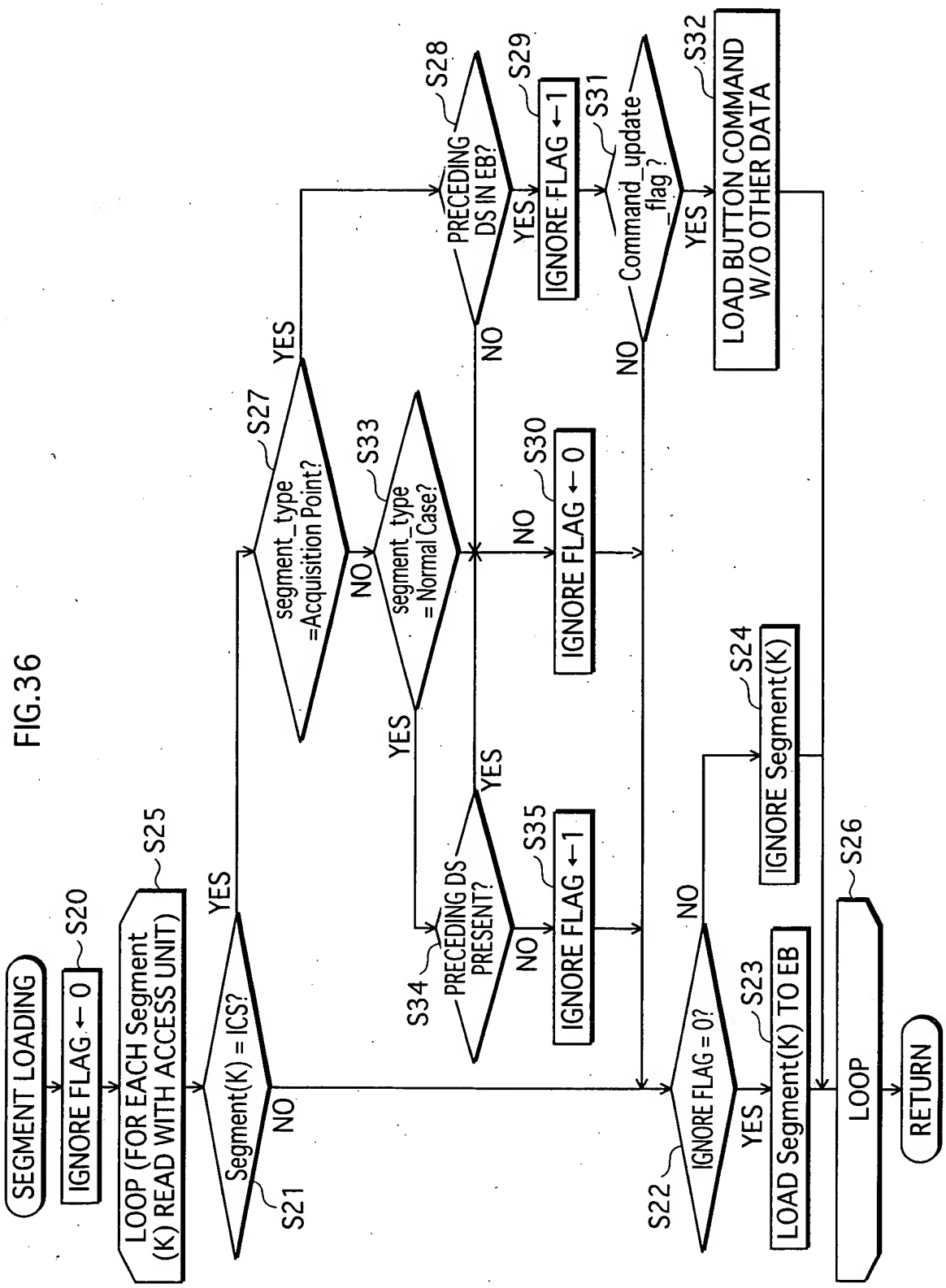

SEGMENT LOADING
S20
IGNORE FLAG ← 0
S25
LOOP (FOR EACH Segment (K) READ WITH ACCESS UNIT)
YES
Segment(K) = ICS?
NO
S21
S27
segment_type =Acquisition Point?
YES
NO
S33
segment_type = Normal Case?
YES
NO
S34
PRECEDING DS PRESENT?
YES
NO
S35
IGNORE FLAG ← 1
S28
PRECEDING DS IN EB?
YES
NO
S29
IGNORE FLAG ← 1
S30
IGNORE FLAG ← 0
S31
Command_update flag ?
YES
NO
S32
LOAD BUTTON COMMAND W/O OTHER DATA
S22
IGNORE FLAG = 0?
YES
NO
S23
LOAD Segment(K) TO EB
S24
IGNORE Segment(K)
S26
LOOP
RETURN

FIG.37

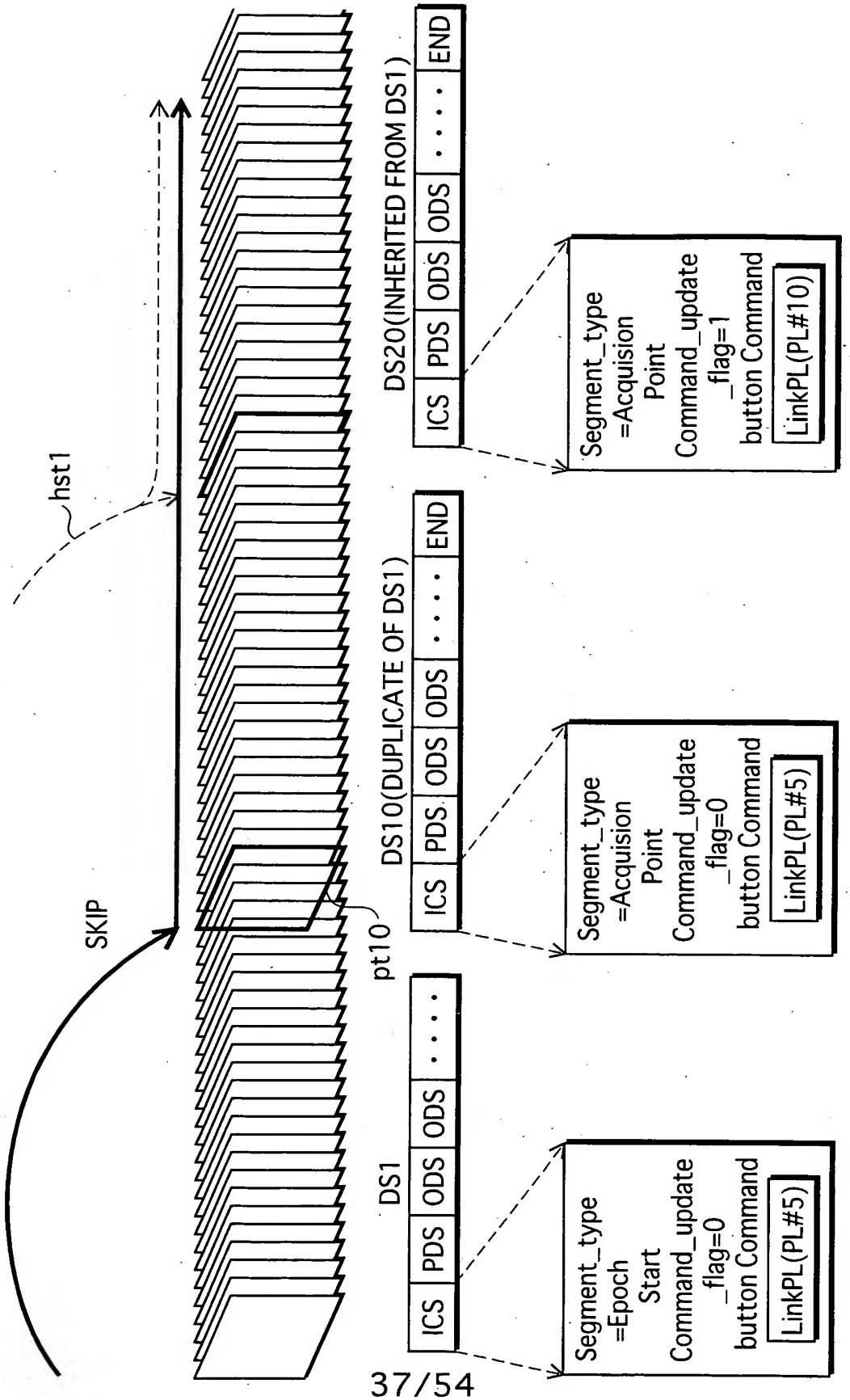

hst1
SKIP
pt10
DS1
ICS
PDS
ODS
ODS
• • • •
Segment_type
=Epoch
Start
Command_update
_flag=0
button Command
LinkPL(PL#5)
DS10(DUPLICATE OF DS1)
ICS
PDS
ODS
ODS
• • • •
END
Segment_type
=Acquision
Point
Command_update
_flag=0
button Command
LinkPL(PL#5)
DS20(INHERITED FROM DS1)
ICS
PDS
ODS
ODS
• • • •
END
Segment_type
=Acquision
Point
Command_update
_flag=1
button Command
LinkPL(PL#10)

FIG.38

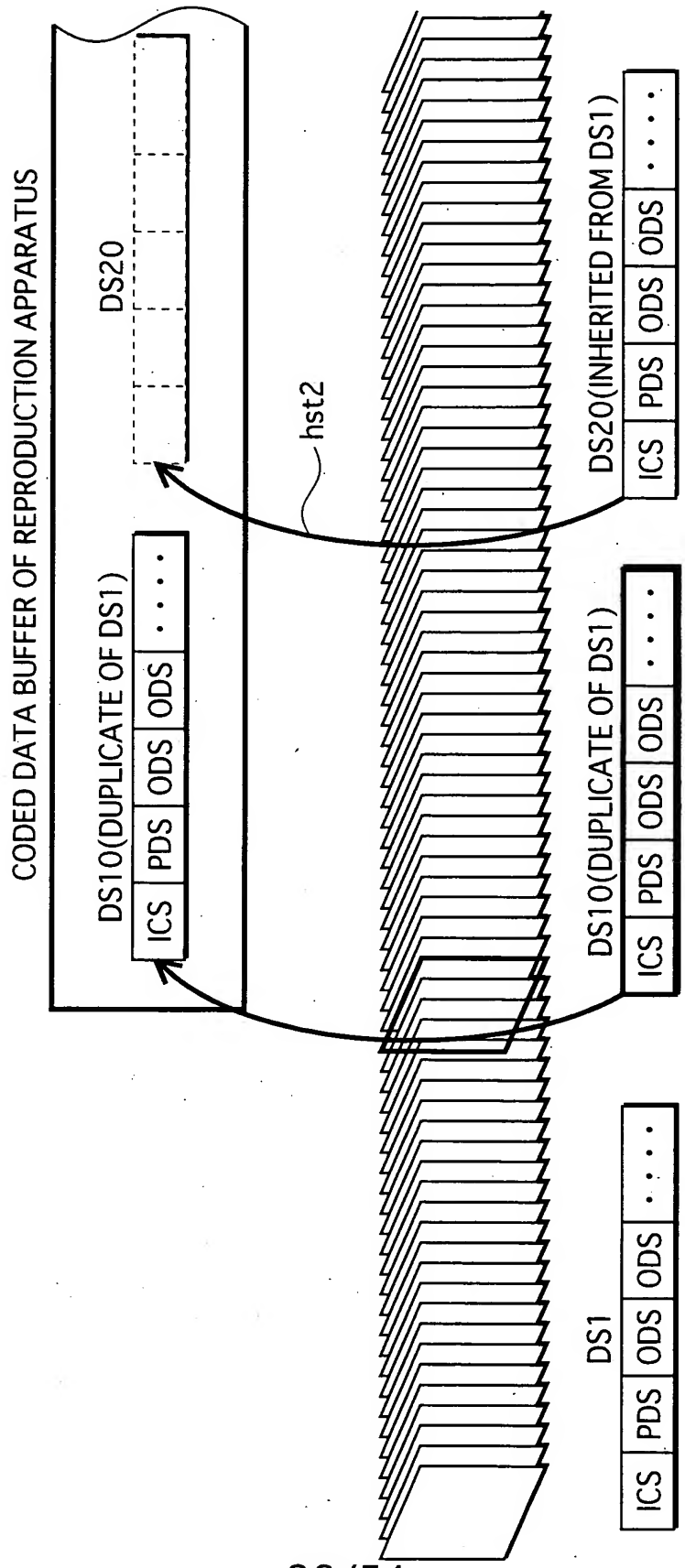
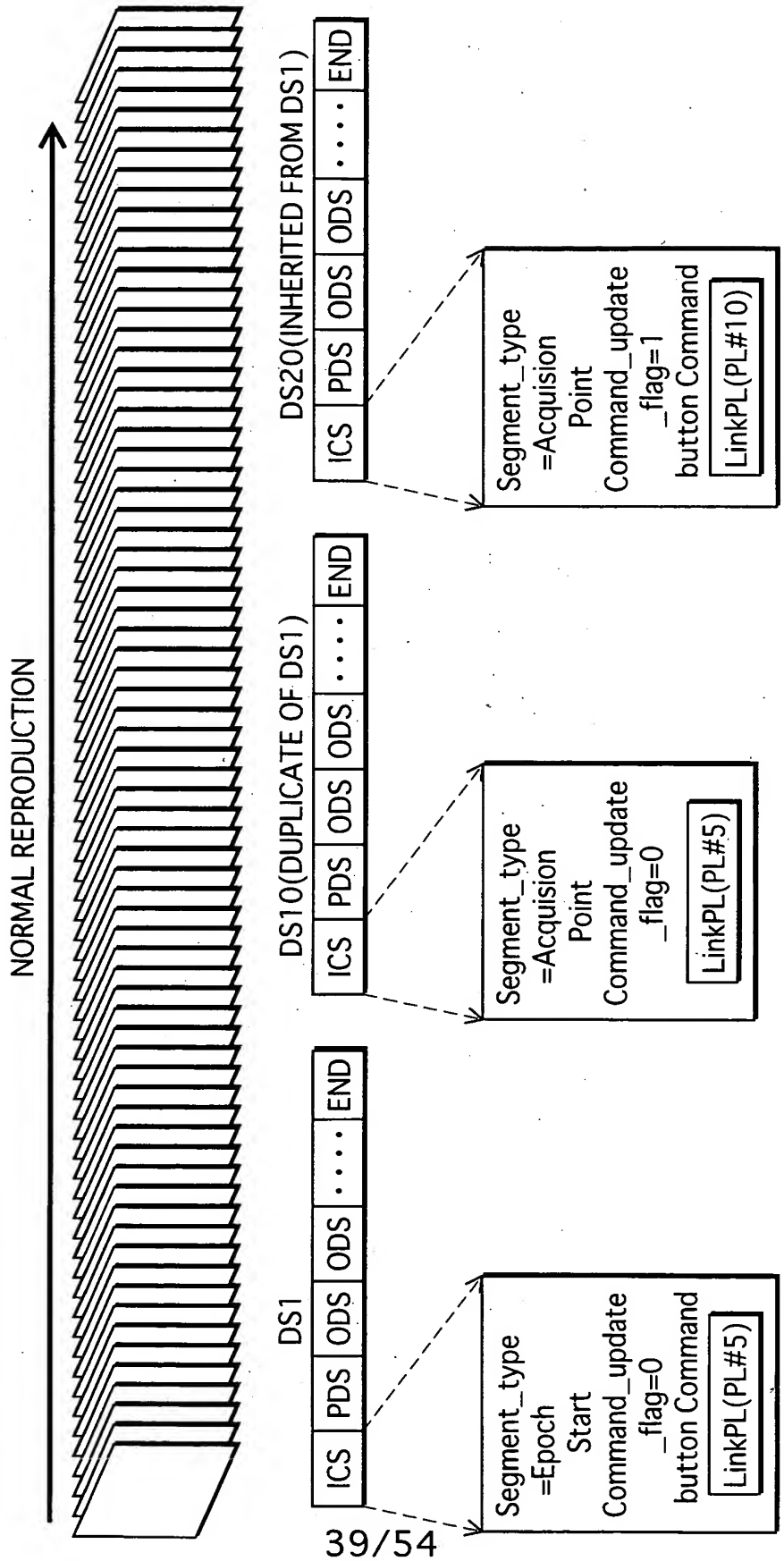

CODED DATA BUFFER OF REPRODUCTION APPARATUS
DS20
DS10(DUPLICATE OF DS1)
ICS
PDS
ODS
ODS
• • • •
hst2
DS20(INHERITED FROM DS1)
ICS
PDS
ODS
ODS
• • • •
DS10(DUPLICATE OF DS1)
ICS
PDS
ODS
ODS
ODS
• • • •
DS1
ICS
PDS
ODS
ODS
• • • •

FIG.39


NORMAL REPRODUCTION
DS1
ICS
PDS
ODS
ODS
• • • •
END
Segment_type
=Epoch
Start
Command_update
_flag=0
button Command
LinkPL(PL#5)
DS10(DUPLICATE OF DS1)
ICS
PDS
ODS
ODS
• • • •
END
Segment_type
=Acquision
Point
Command_update
_flag=0
LinkPL(PL#5)
DS20(INHERITED FROM DS1)
ICS
PDS
ODS
ODS
• • • •
END
Segment_type
=Acquision
Point
Command_update
_flag=1
button Command
LinkPL(PL#10)

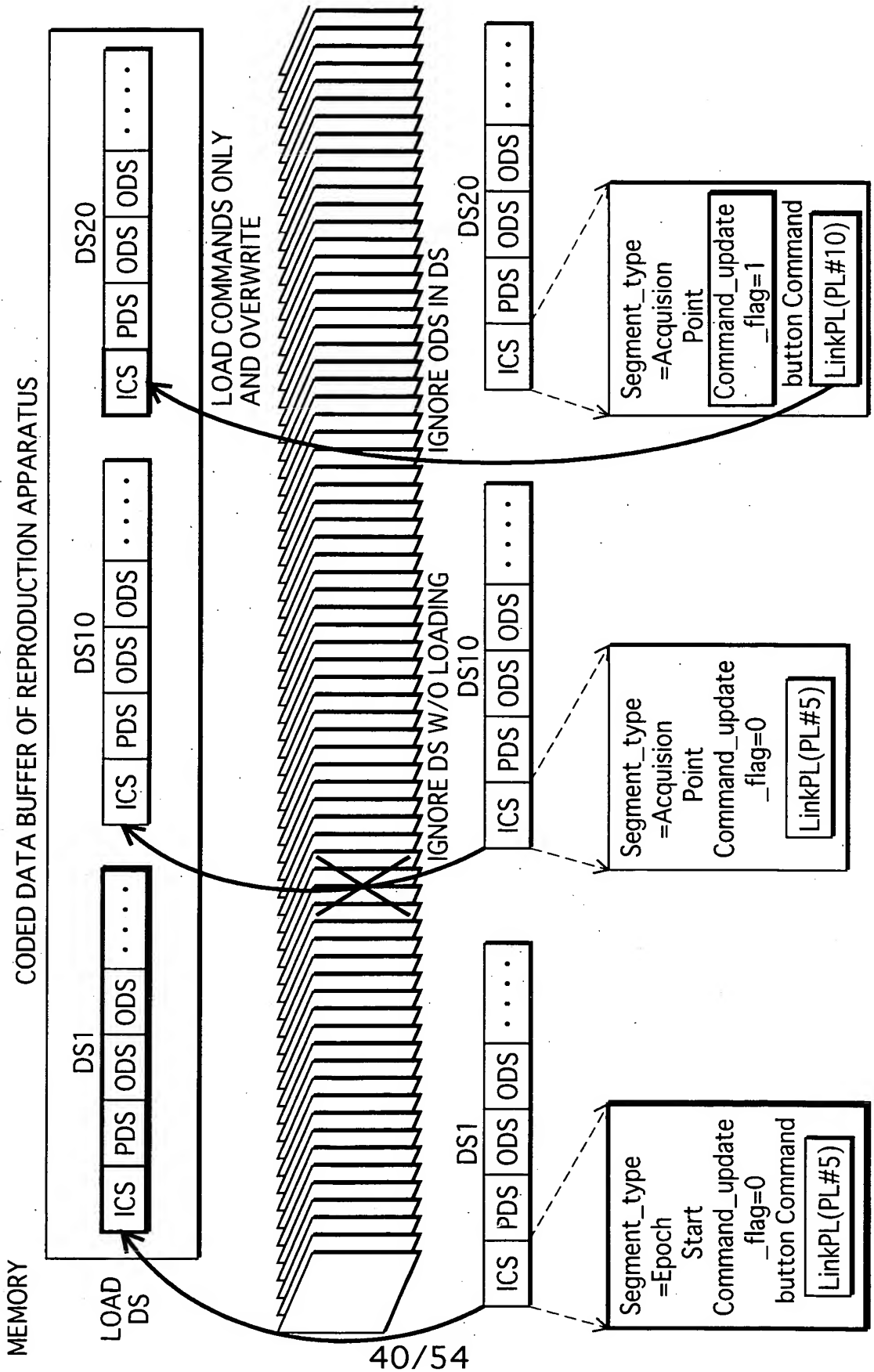


FIG.40
MEMORY
CODED DATA BUFFER OF REPRODUCTION APPARATUS
LOAD DS
DS1
ICS
PDS
ODS
ODS
DS10
ICS
PDS
ODS
ODS
DS20
ICS
PDS
ODS
ODS
LOAD COMMANDS ONLY AND OVERWRITE
IGNORE ODS IN DS
IGNORE DS W/O LOADING
Segment_type =Epoch Start
Command_update _flag=0
button Command
LinkPL(PL#5)
Segment_type =Acquision Point
Command_update _flag=0
LinkPL(PL#5)
Segment_type =Acquision Point
Command_update _flag=1
button Command
LinkPL(PL#10)

FIG.41

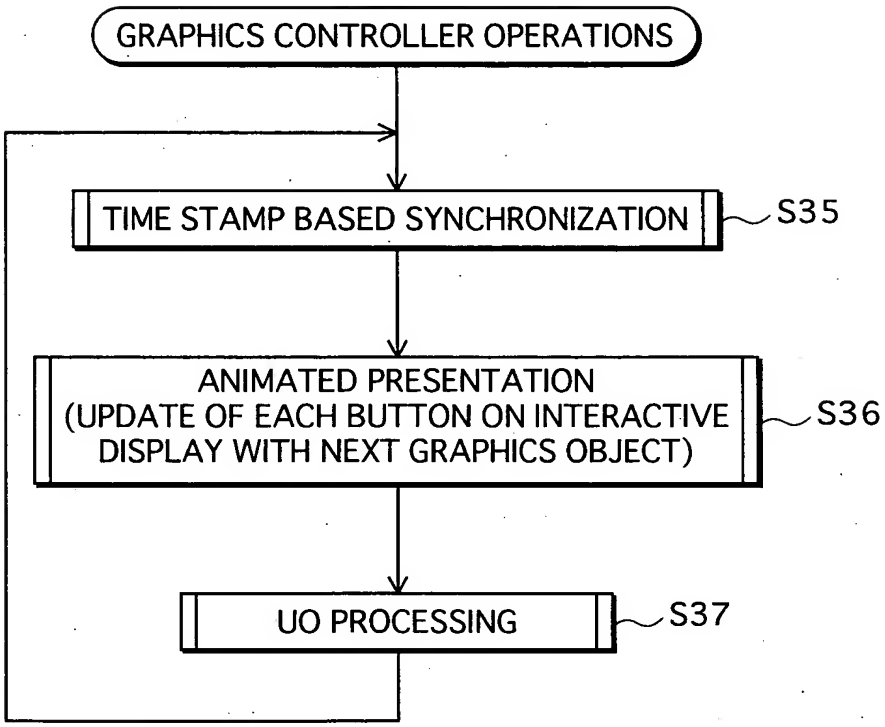

GRAPHICS CONTROLLER OPERATIONS
TIME STAMP BASED SYNCHRONIZATION
S35
ANIMATED PRESENTATION
(UPDATE OF EACH BUTTON ON INTERACTIVE
DISPLAY WITH NEXT GRAPHICS OBJECT)
S36
UO PROCESSING
S37

FIG.42

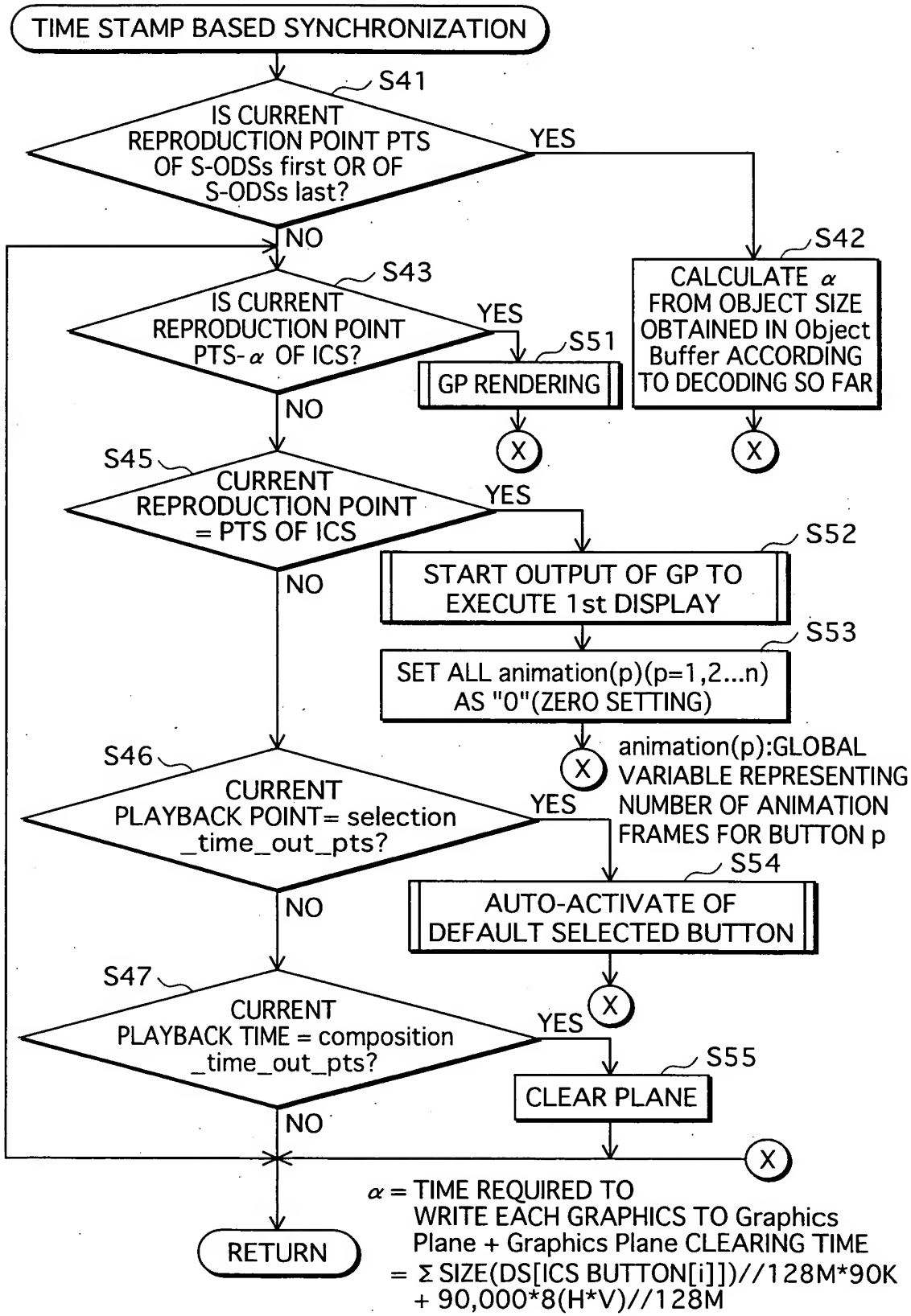

TIME STAMP BASED SYNCHRONIZATION
S41
IS CURRENT REPRODUCTION POINT PTS OF S-ODSs first OR OF S-ODSs last?
YES
NO
S42
CALCULATE α FROM OBJECT SIZE OBTAINED IN Object Buffer ACCORDING TO DECODING SO FAR
S43
IS CURRENT REPRODUCTION POINT PTS-α OF ICS?
YES
S51
GP RENDERING
NO
X
X
S45
CURRENT REPRODUCTION POINT = PTS OF ICS
YES
NO
S52
START OUTPUT OF GP TO EXECUTE 1st DISPLAY
S53
SET ALL animation(p)(p=1,2...n) AS "0"(ZERO SETTING)
X
animation(p):GLOBAL VARIABLE REPRESENTING NUMBER OF ANIMATION FRAMES FOR BUTTON p
S46
CURRENT PLAYBACK POINT= selection _time_out_pts?
YES
NO
S54
AUTO-ACTIVATE OF DEFAULT SELECTED BUTTON
S47
CURRENT PLAYBACK TIME = composition _time_out_pts?
X
YES
NO
S55
CLEAR PLANE
X
RETURN
α = TIME REQUIRED TO WRITE EACH GRAPHICS TO Graphics Plane + Graphics Plane CLEARING TIME
= Σ SIZE(DS[ICS BUTTON[i]])//128M*90K + 90,000*8(H*V)//128M

FIG.43

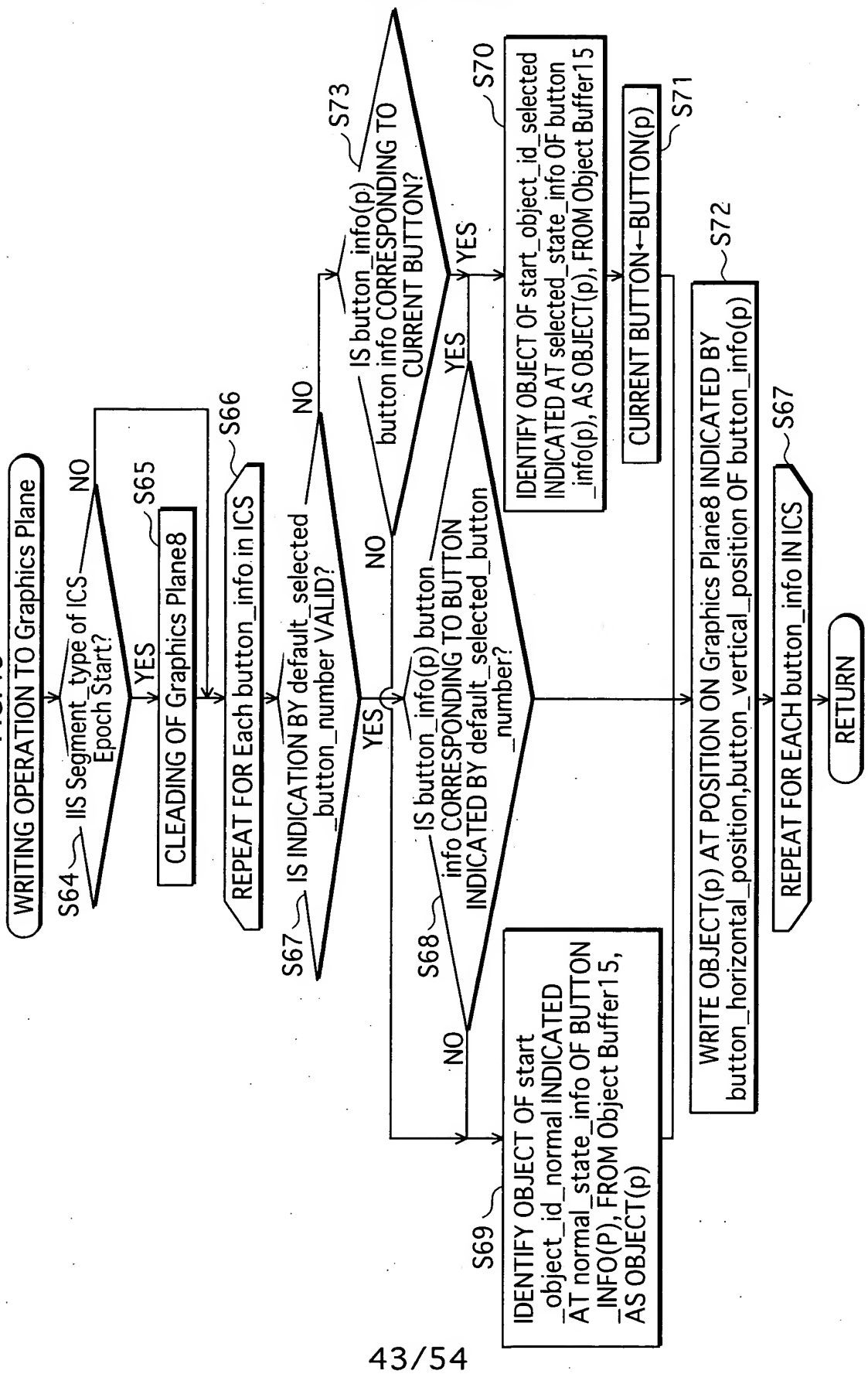

WRITING OPERATION TO Graphics Plane
S64
IIS Segment_type of ICS Epoch Start?
NO
YES
S65
CLEADING OF Graphics Plane8
S66
REPEAT FOR Each button_info in ICS
S67
IS INDICATION BY default_selected _button_number VALID?
NO
YES
S68
IS button_info(p) button info CORRESPONDING TO BUTTON INDICATED BY default_selected_button _number?
NO
YES
S69
IDENTIFY OBJECT OF start _object_id_normal INDICATED AT normal_state_info OF BUTTON _INFO(P), FROM Object Buffer15, AS OBJECT(p)
S70
IDENTIFY OBJECT OF start_object_id_selected INDICATED AT selected_state_info OF button _info(p), AS OBJECT(p), FROM Object Buffer15
S71
CURRENT BUTTON←BUTTON(p)
S72
WRITE OBJECT(p) AT POSITION ON Graphics Plane8 INDICATED BY button_horizontal_position,button_vertical_position OF button_info(p)
S67
REPEAT FOR EACH button_info IN ICS
RETURN
S73
IS button_info(p) button info CORRESPONDING TO CURRENT BUTTON?
NO
YES

FIG.44

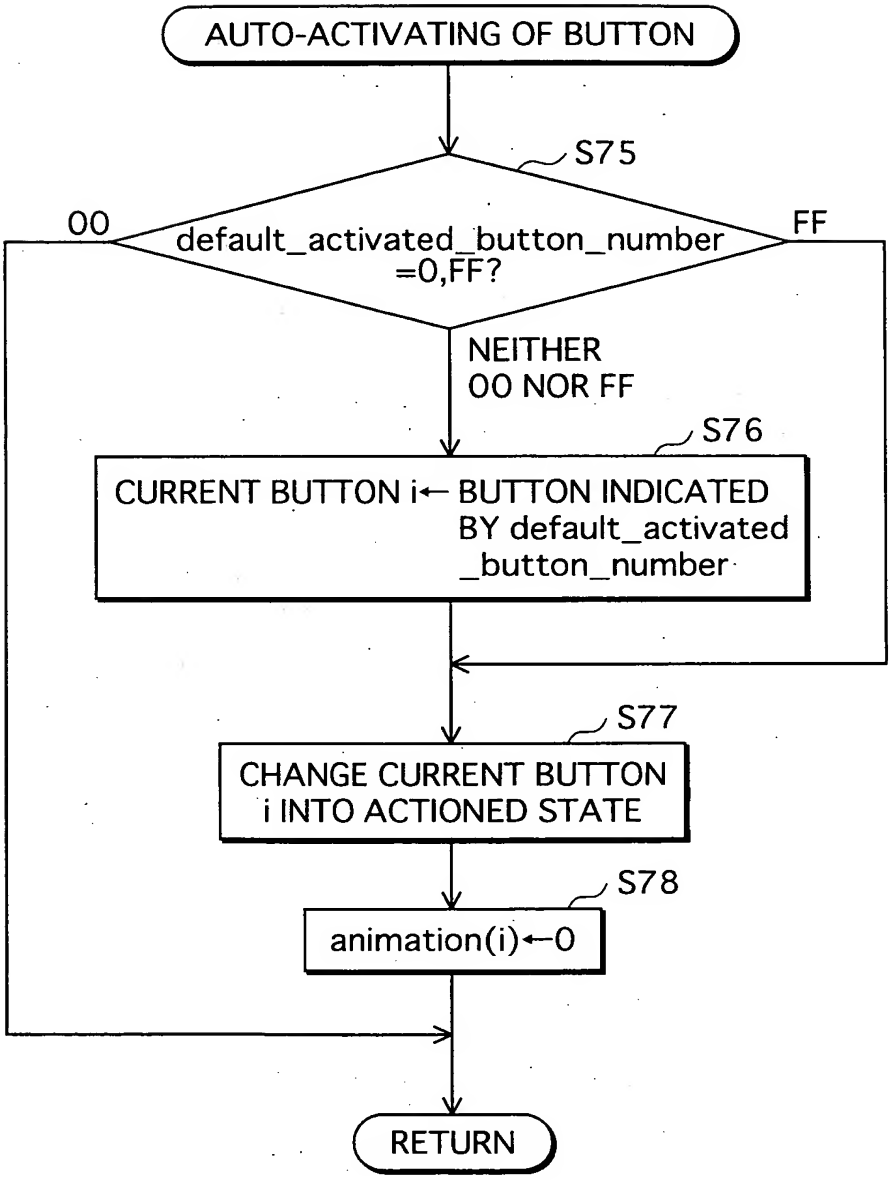

AUTO-ACTIVATING OF BUTTON
S75
default_activated_button_number =0,FF?
00
FF
NEITHER 00 NOR FF
S76
CURRENT BUTTON i← BUTTON INDICATED BY default_activated _button_number
S77
CHANGE CURRENT BUTTON i INTO ACTIONED STATE
S78
animation(i)←0
RETURN

FIG.45

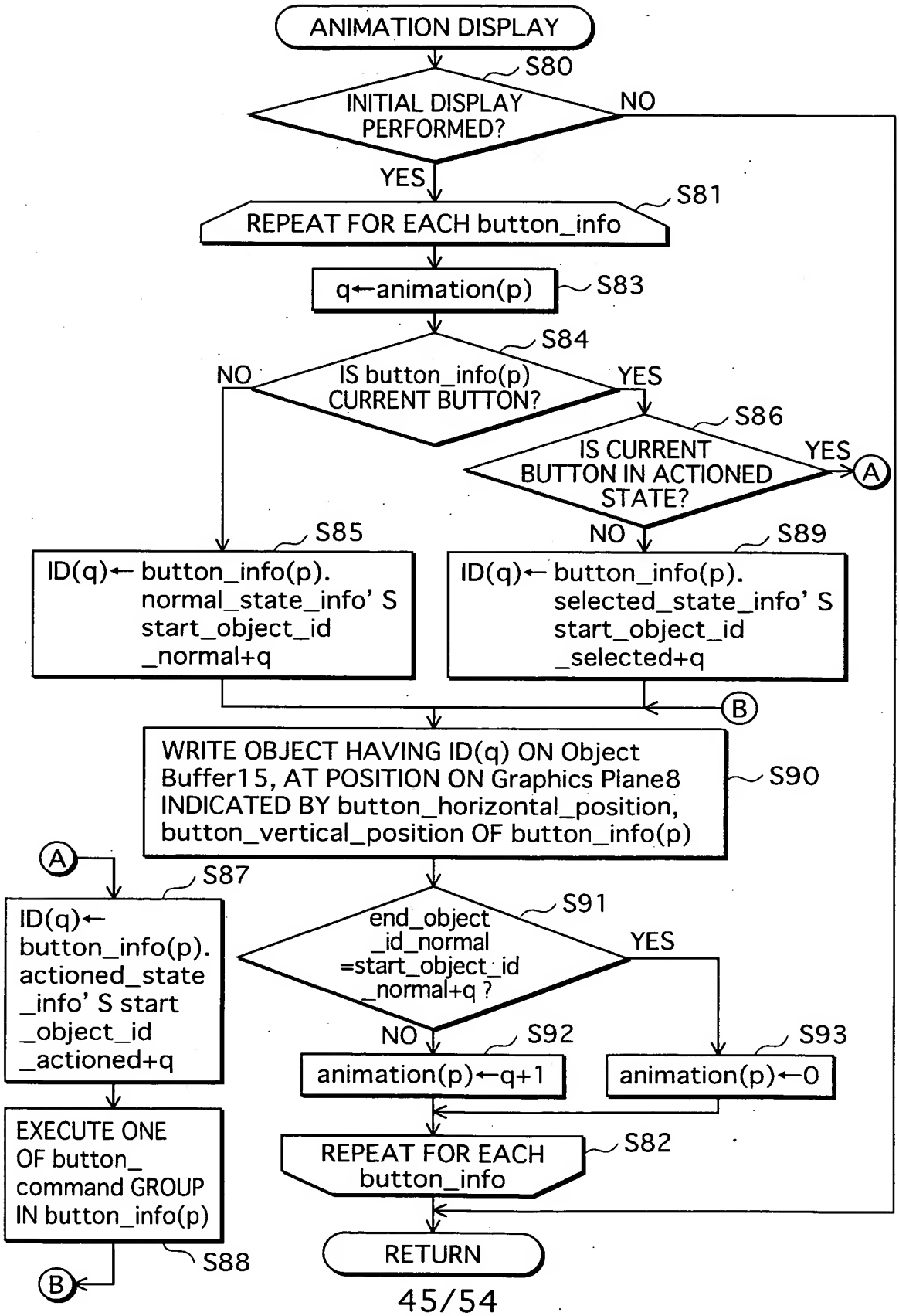

ANIMATION DISPLAY
S80
INITIAL DISPLAY PERFORMED?
NO
YES
S81
REPEAT FOR EACH button_info
q←animation(p)
S83
S84
NO
IS button_info(p) CURRENT BUTTON?
YES
S86
IS CURRENT BUTTON IN ACTIONED STATE?
YES
A
NO
S85
ID(q)← button_info(p). normal_state_info' S start_object_id _normal+q
S89
ID(q)← button_info(p). selected_state_info' S start_object_id _selected+q
B
WRITE OBJECT HAVING ID(q) ON Object Buffer15, AT POSITION ON Graphics Plane8 INDICATED BY button_horizontal_position, button_vertical_position OF button_info(p)
S90
A
S87
ID(q)← button_info(p). actioned_state _info' S start _object_id _actioned+q
S91
end_object _id_normal =start_object_id _normal+q ?
YES
NO
S92
animation(p)←q+1
S93
animation(p)←0
EXECUTE ONE OF button_ command GROUP IN button_info(p)
S88
B
REPEAT FOR EACH button_info
S82
RETURN

FIG.46

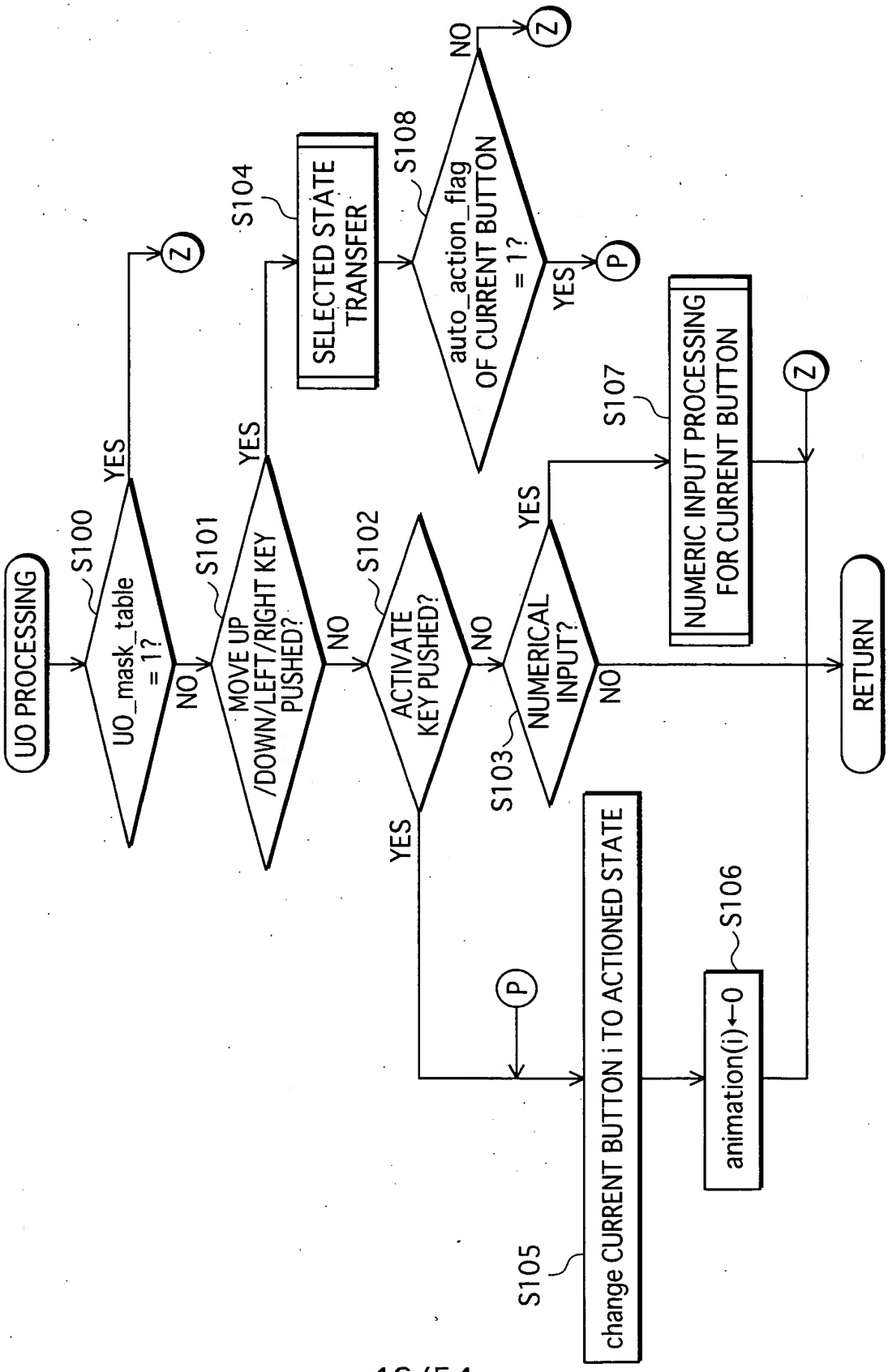

UO PROCESSING
S100
UO_mask_table = 1?
YES
NO
Z
S101
MOVE UP /DOWN/LEFT/RIGHT KEY PUSHED?
YES
NO
S104
SELECTED STATE TRANSFER
S102
ACTIVATE KEY PUSHED?
YES
NO
S108
auto_action_flag OF CURRENT BUTTON = 1?
NO
YES
Z
P
S103
NUMERICAL INPUT?
YES
NO
S107
NUMERIC INPUT PROCESSING FOR CURRENT BUTTON
Z
RETURN
P
S105
change CURRENT BUTTON i TO ACTIONED STATE
S106
animation(i)←0

FIG.47

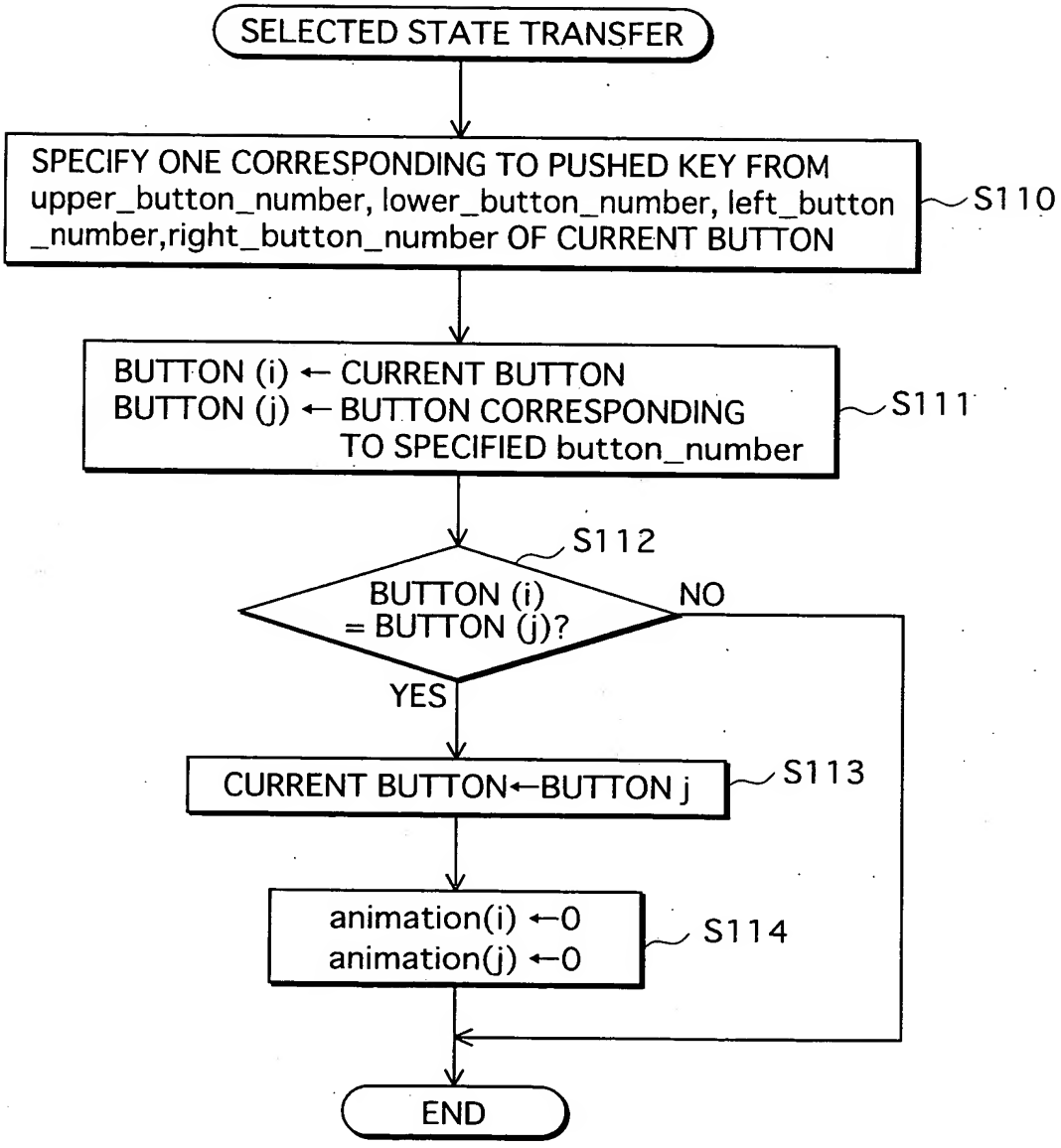

SELECTED STATE TRANSFER
SPECIFY ONE CORRESPONDING TO PUSHED KEY FROM upper_button_number, lower_button_number, left_button _number,right_button_number OF CURRENT BUTTON
S110
BUTTON (i) ← CURRENT BUTTON
BUTTON (j) ← BUTTON CORRESPONDING TO SPECIFIED button_number
S111
S112
BUTTON (i) = BUTTON (j)?
NO
YES
CURRENT BUTTON←BUTTON j
S113
animation(i) ←0
animation(j) ←0
S114
END

FIG.48

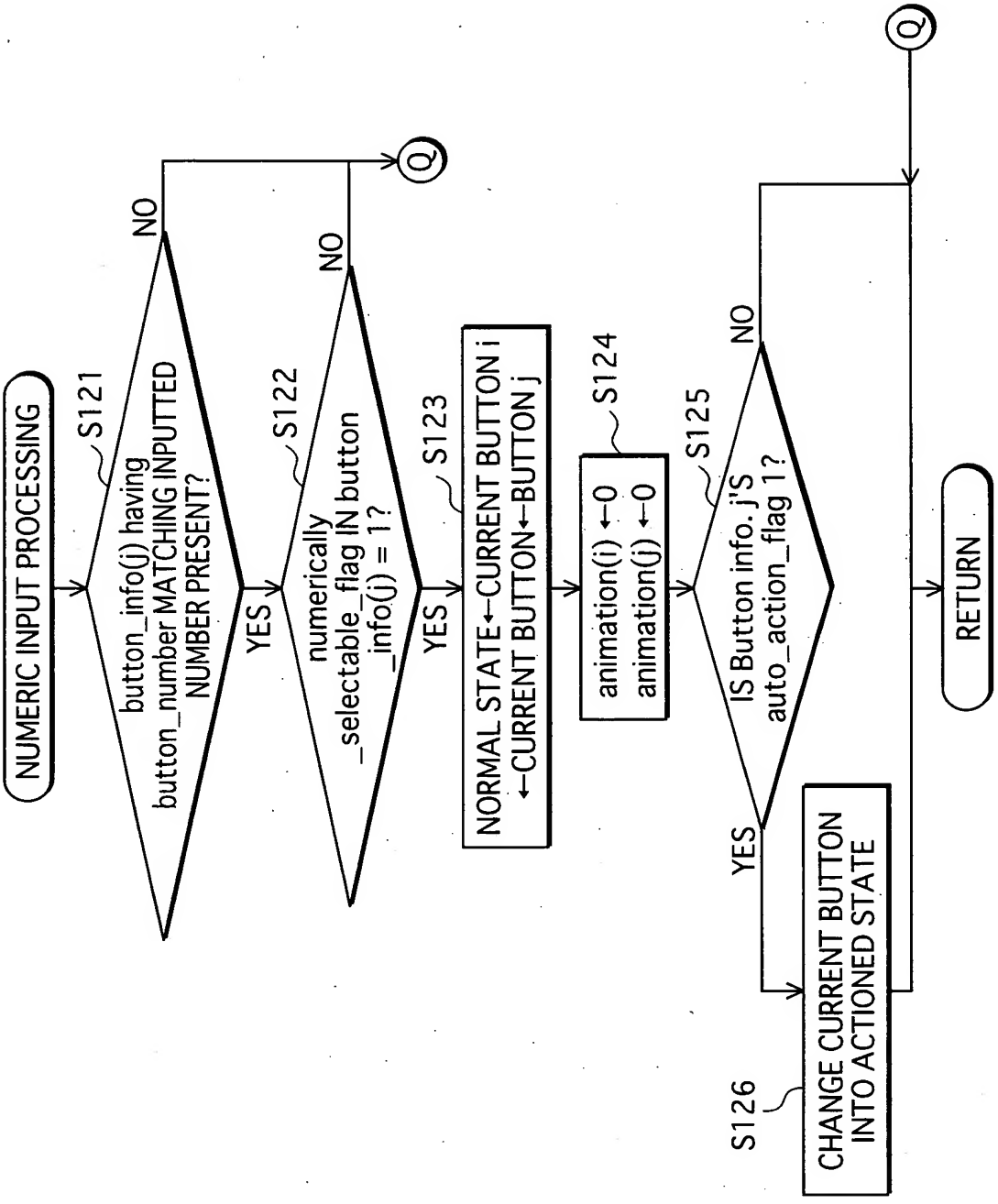

NUMERIC INPUT PROCESSING
S121
button_info(j) having button_number MATCHING INPUTTED NUMBER PRESENT?
NO
YES
S122
numerically _selectable_flag IN button _info(j) = 1?
NO
YES
S123
NORMAL STATE←CURRENT BUTTON i
←CURRENT BUTTON←BUTTON j
S124
animation(i) ←0
animation(j) ←0
S125
IS Button info. j'S auto_action_flag 1?
NO
YES
S126
CHANGE CURRENT BUTTON INTO ACTIONED STATE
RETURN
Q
Q

FIG.49

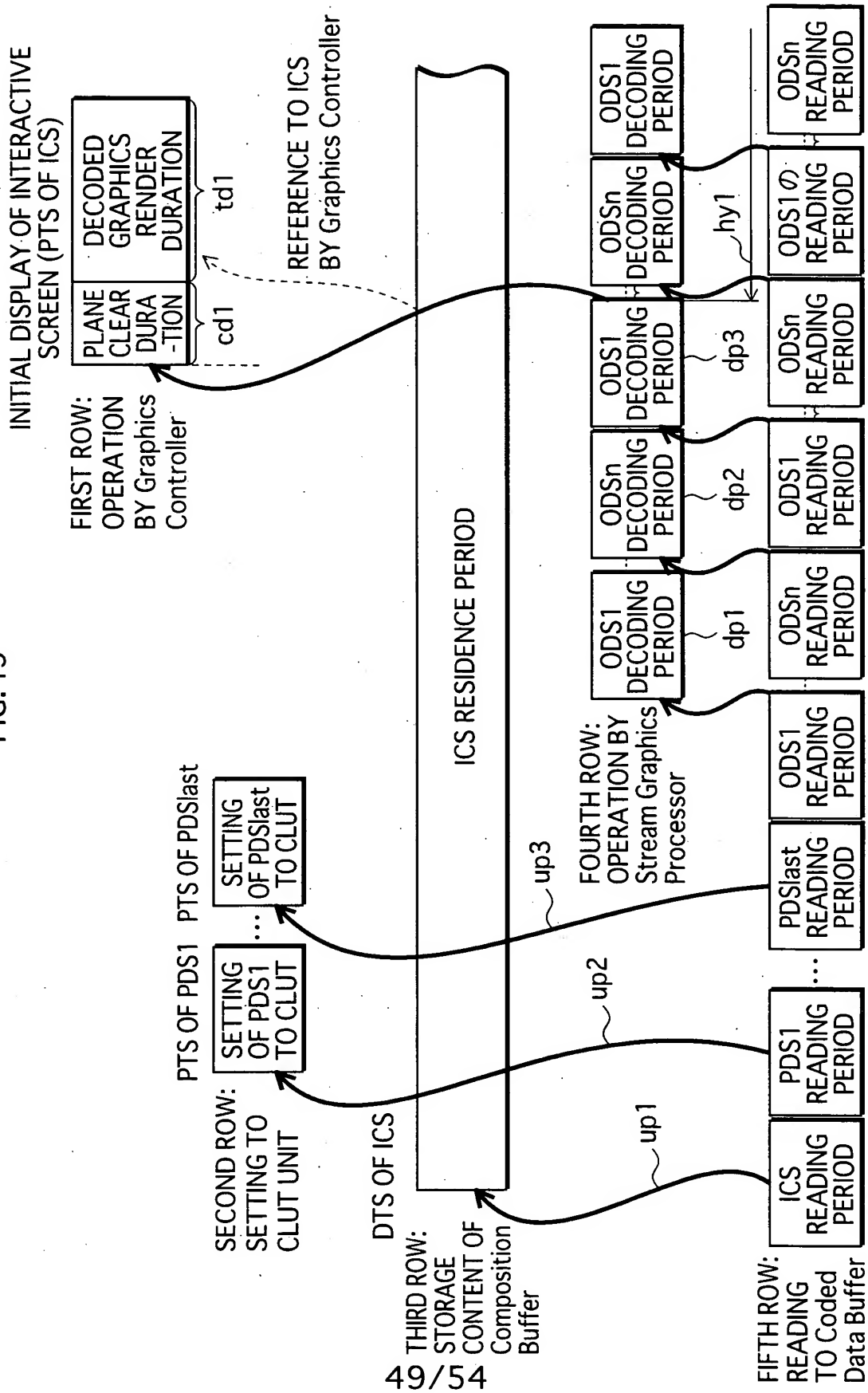

INITIAL DISPLAY OF INTERACTIVE SCREEN (PTS OF ICS)
FIRST ROW: OPERATION BY Graphics Controller
PLANE CLEAR DURA -TION
DECODED GRAPHICS RENDER DURATION
cd1
td1
REFERENCE TO ICS BY Graphics Controller
SECOND ROW: SETTING TO CLUT UNIT
PTS OF PDS1
SETTING OF PDS1 TO CLUT
PTS OF PDSlast
SETTING OF PDSlast TO CLUT
DTS OF ICS
ICS RESIDENCE PERIOD
THIRD ROW: STORAGE CONTENT OF Composition Buffer
FOURTH ROW: OPERATION BY Stream Graphics Processor
FIFTH ROW: READING TO Coded Data Buffer
ICS READING PERIOD
PDS1 READING PERIOD
PDSlast READING PERIOD
ODS1 READING PERIOD
ODSn READING PERIOD
ODS1 DECODING PERIOD
ODSn DECODING PERIOD
up1
up2
up3
dp1
dp2
dp3
hy1
ODS1Ø READING PERIOD

FIG.50

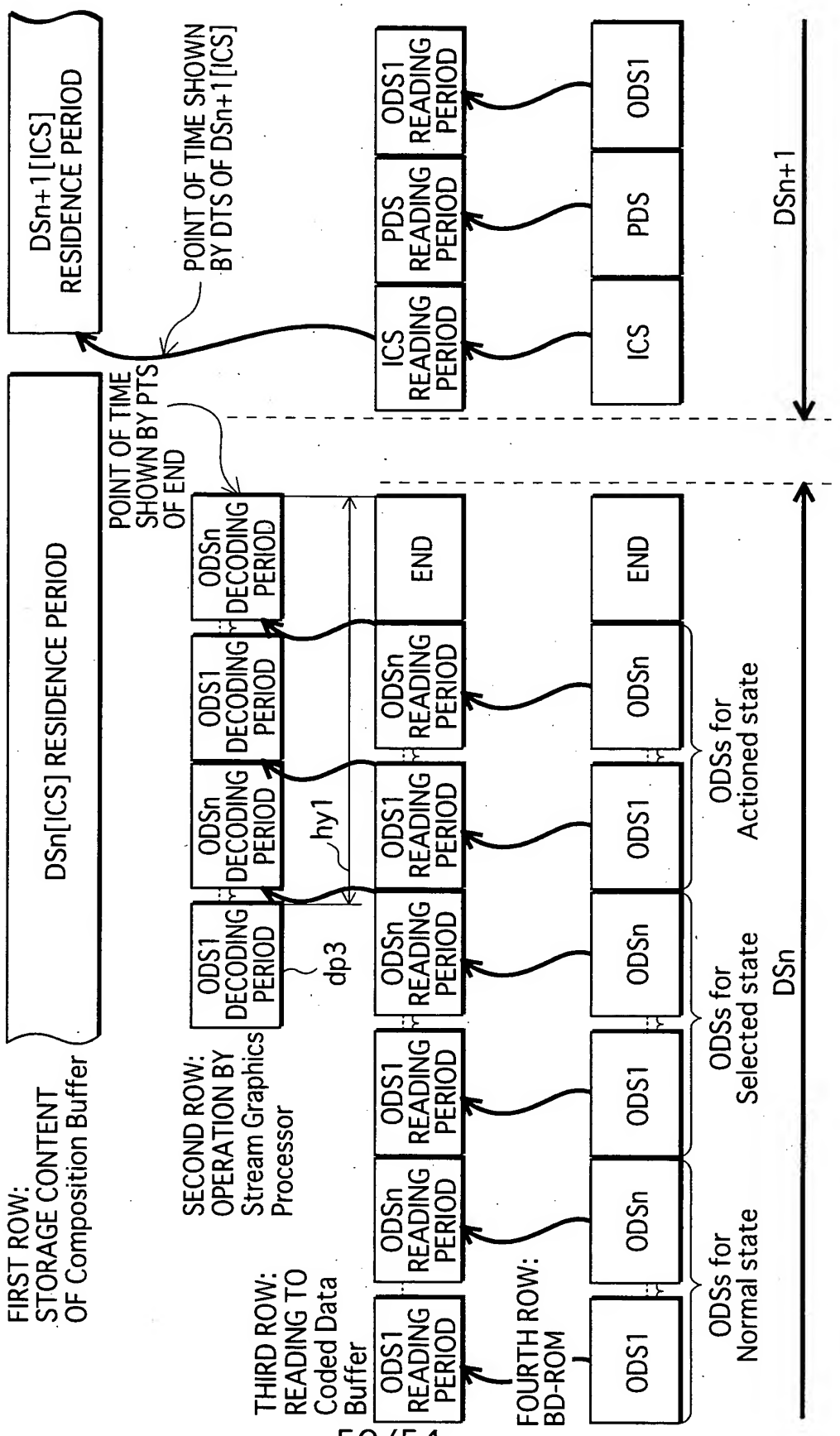

FIRST ROW: STORAGE CONTENT OF Composition Buffer
DSn[ICS] RESIDENCE PERIOD
DSn+1[ICS] RESIDENCE PERIOD
POINT OF TIME SHOWN BY DTS OF DSn+1[ICS]
POINT OF TIME SHOWN BY PTS OF END
SECOND ROW: OPERATION BY Stream Graphics Processor
ODS1 DECODING PERIOD
ODSn DECODING PERIOD
ODS1 DECODING PERIOD
ODSn DECODING PERIOD
dp3
hy1
ODSn READING PERIOD
ODS1 READING PERIOD
ODSn READING PERIOD
ODS1 READING PERIOD
END
ICS READING PERIOD
PDS READING PERIOD
ODS1 READING PERIOD
THIRD ROW: READING TO Coded Data Buffer
FOURTH ROW: BD-ROM
ODS1
ODSn
ODS1
ODSn
ODS1
ODSn
ODS1
ICS
PDS
ODS1
ODSs for Normal state
ODSs for Selected state
ODSs for Actioned state
DSn
DSn+1

FIG.51

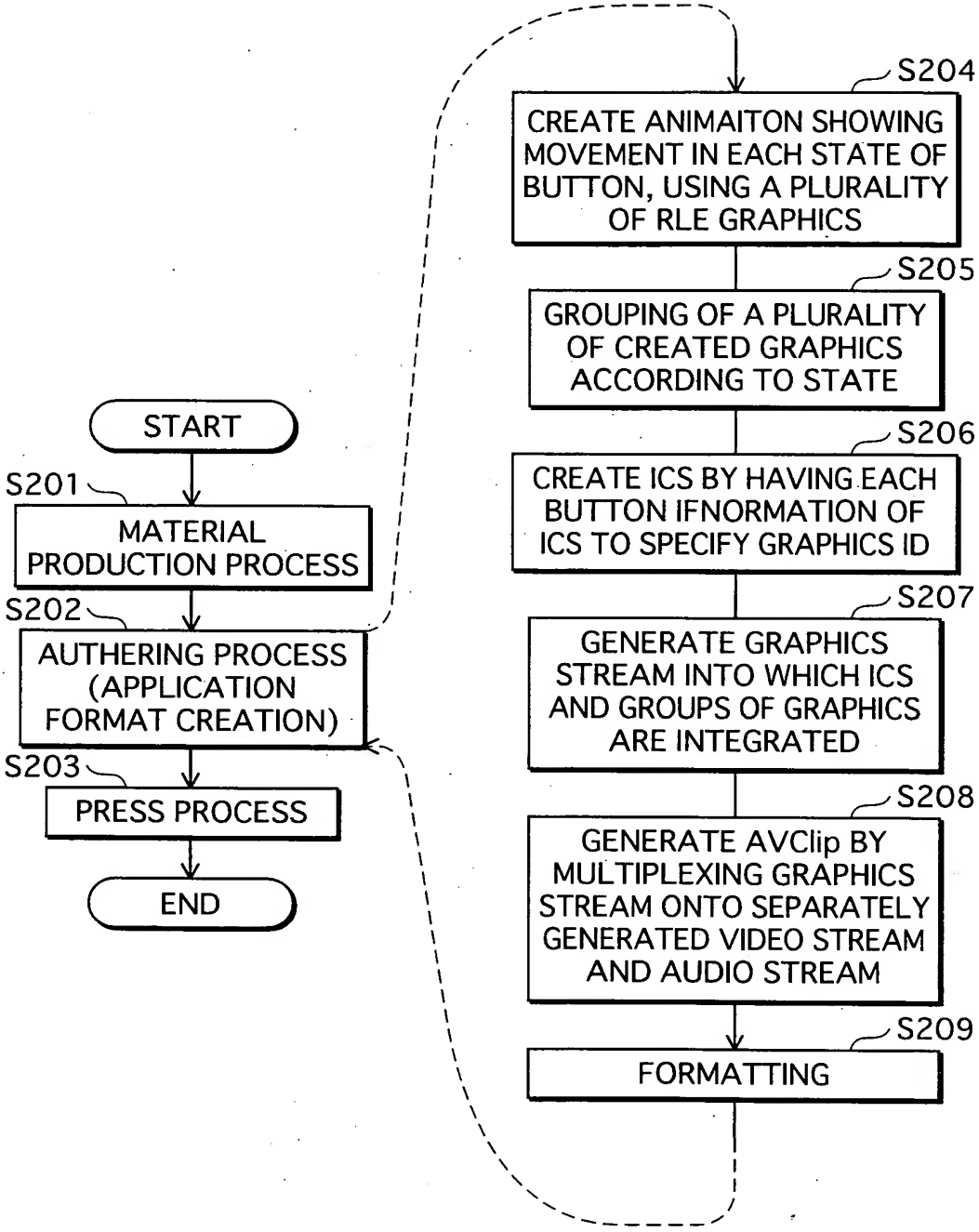

START
S201
MATERIAL PRODUCTION PROCESS
S202
AUTHERING PROCESS (APPLICATION FORMAT CREATION)
S203
PRESS PROCESS
END
S204
CREATE ANIMAITON SHOWING MOVEMENT IN EACH STATE OF BUTTON, USING A PLURALITY OF RLE GRAPHICS
S205
GROUPING OF A PLURALITY OF CREATED GRAPHICS ACCORDING TO STATE
S206
CREATE ICS BY HAVING EACH BUTTON IFNORMATION OF ICS TO SPECIFY GRAPHICS ID
S207
GENERATE GRAPHICS STREAM INTO WHICH ICS AND GROUPS OF GRAPHICS ARE INTEGRATED
S208
GENERATE AVClip BY MULTIPLEXING GRAPHICS STREAM ONTO SEPARATELY GENERATED VIDEO STREAM AND AUDIO STREAM
S209
FORMATTING

FIG.52

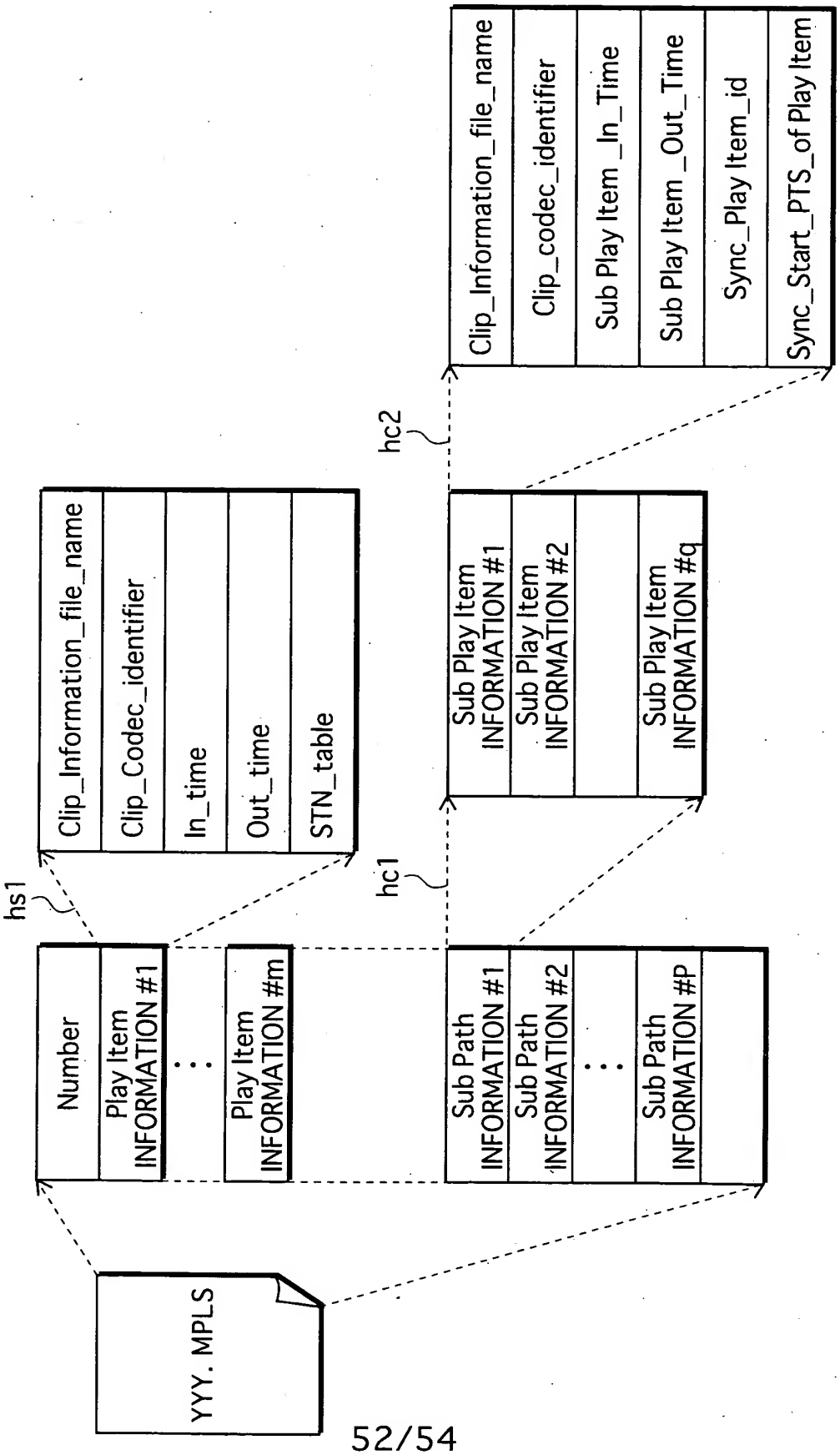

YYY. MPLS
Number
Play Item INFORMATION #1
Play Item INFORMATION #m
Sub Path INFORMATION #1
Sub Path INFORMATION #2
Sub Path INFORMATION #P
hs1
hc1
hc2
Clip_Information_file_name
Clip_Codec_identifier
In_time
Out_time
STN_table
Sub Play Item INFORMATION #1
Sub Play Item INFORMATION #2
Sub Play Item INFORMATION #q
Clip_Information_file_name
Clip_codec_identifier
Sub Play Item _In_Time
Sub Play Item _Out_Time
Sync_Play Item_id
Sync_Start_PTS_of Play Item

FIG.53

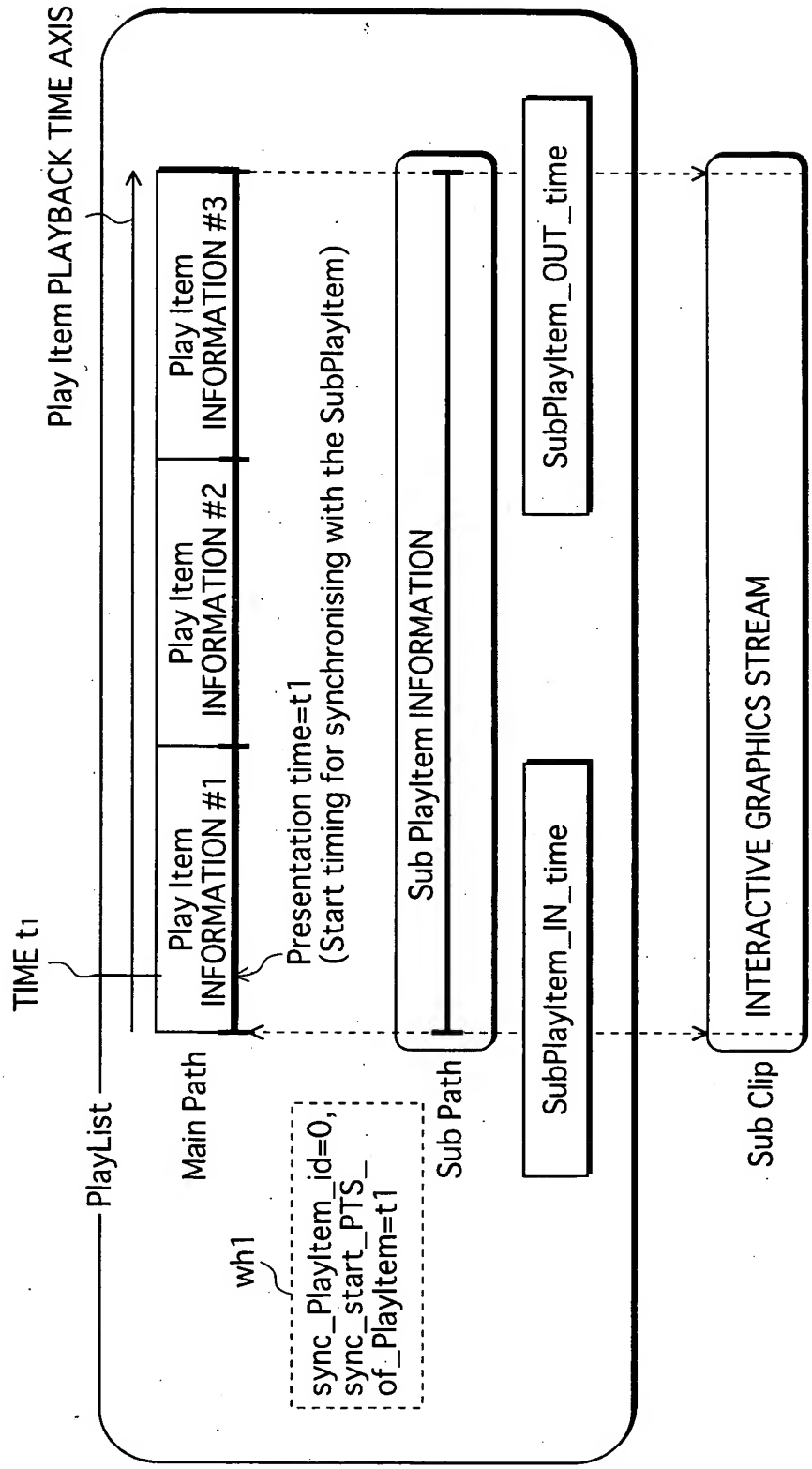
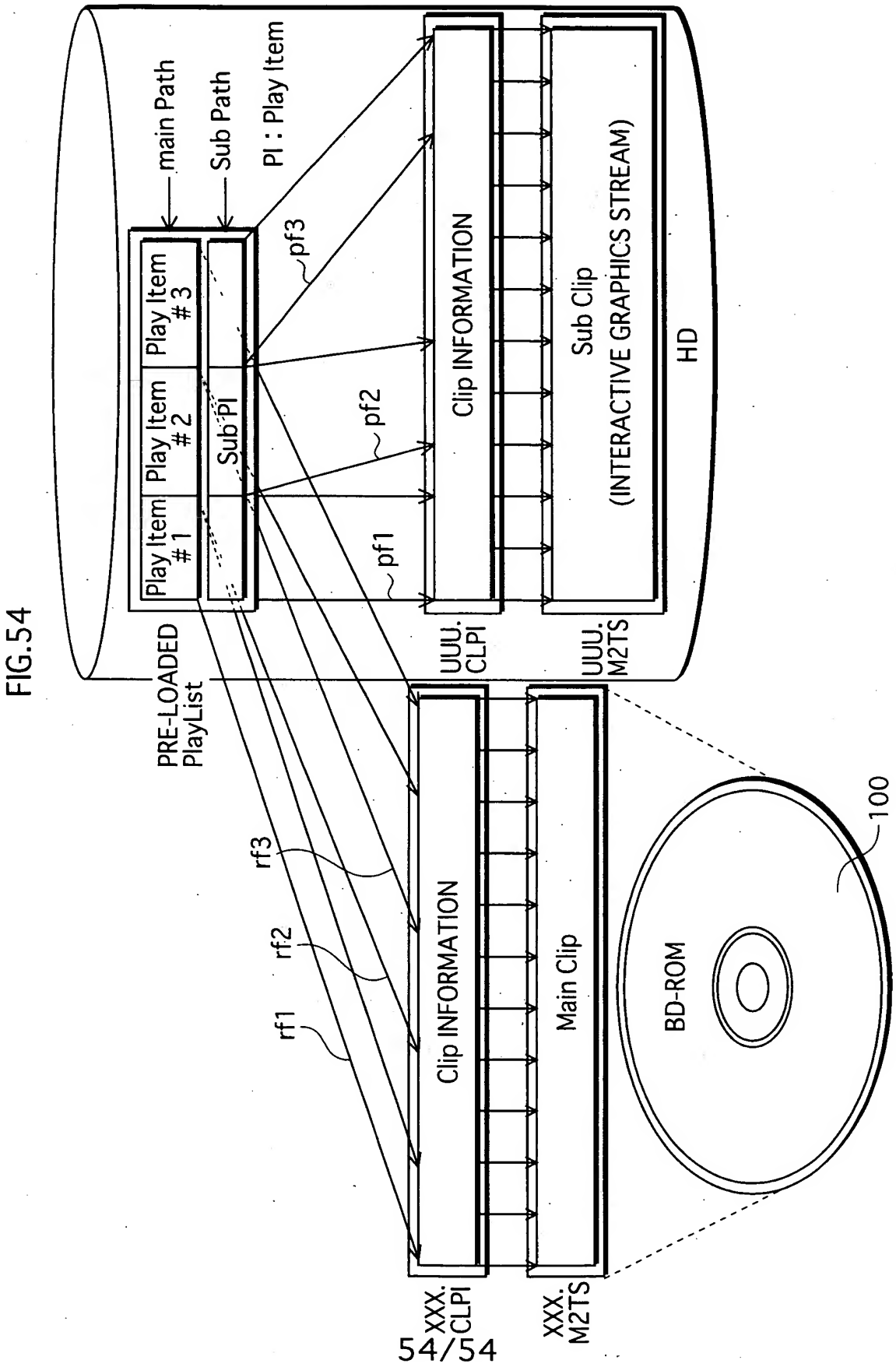

Play Item PLAYBACK TIME AXIS
TIME t1
PlayList
Main Path
Play Item INFORMATION #1
Play Item INFORMATION #2
Play Item INFORMATION #3
Presentation time=t1
(Start timing for synchronising with the SubPlayItem)
wh1
sync_PlayItem_id=0,
sync_start_PTS_
of_PlayItem=t1
Sub Path
Sub PlayItem INFORMATION
SubPlayItem_IN_time
SubPlayItem_OUT_time
Sub Clip
INTERACTIVE GRAPHICS STREAM

FIG.54


main Path
Sub Path
PI : Play Item
Play Item #3
Play Item #2
Play Item #1
Sub PI
pf3
pf2
pf1
Clip INFORMATION
Sub Clip
(INTERACTIVE GRAPHICS STREAM)
HD
PRE-LOADED PlayList
UUU. CLPI
UUU. M2TS
rf3
rf2
rf1
Clip INFORMATION
Main Clip
BD-ROM
100
XXX. CLPI
XXX. M2TS